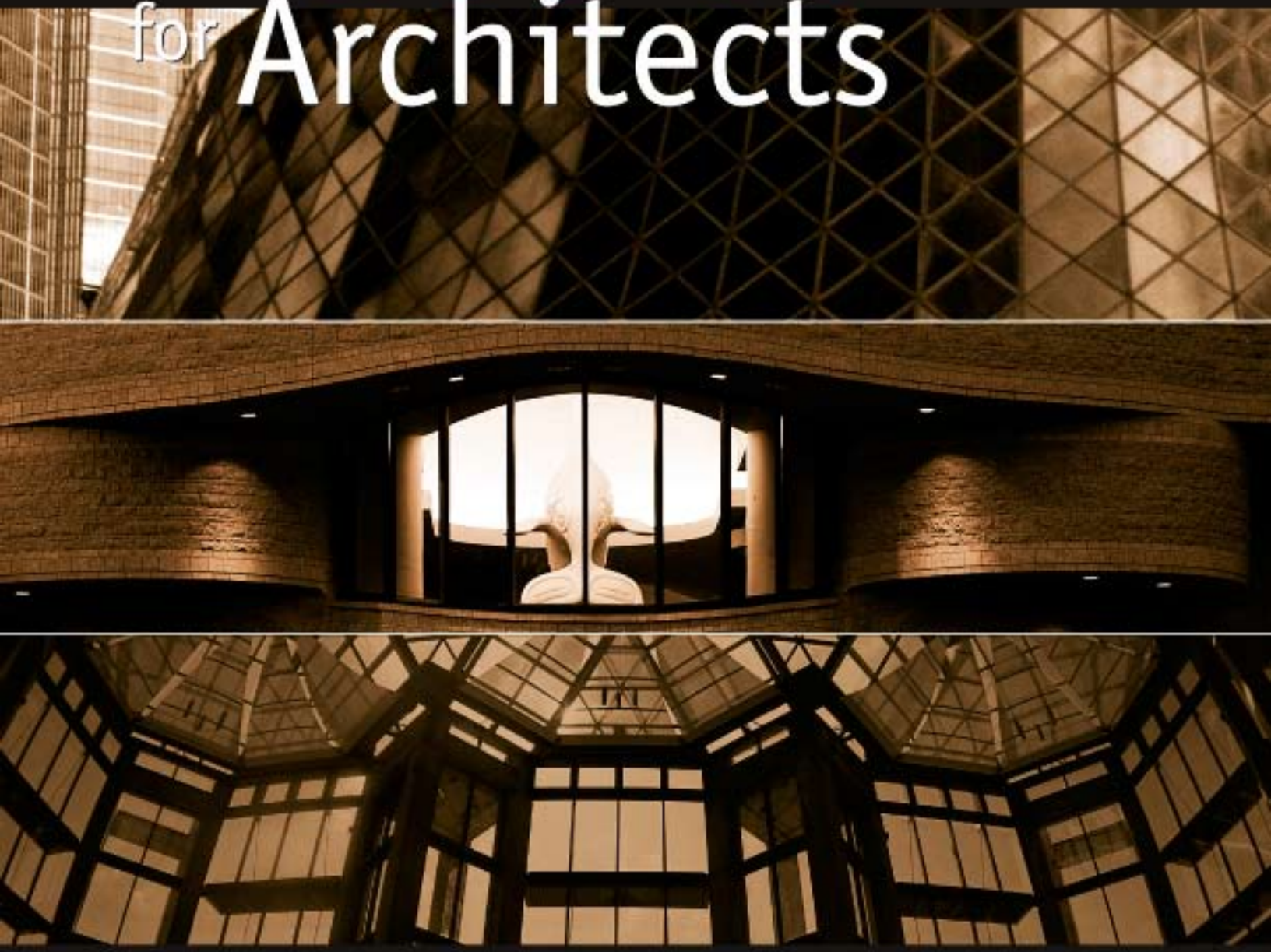
Canadian Handbook of Practice for Architects



SECOND EDITION

The Canadian Handbook of Practice for Architects
Second Edition 2009

This Handbook has been developed based on the First Edition of 1999, its four subsequent supplements, and through the review and input of an Editorial Board comprised architects from each region of Canada.

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Introduction

The practice of architecture requires a wide range of professional skills. These include: the knowledge and skill to design buildings; a thorough understanding of sound and durable building science and construction; construction economics; proficiency in the application of business and legal principles; and the ability to motivate, coordinate, and manage a complex group of participants. The architect should be a be designer, construction expert, and manager. It is hoped that this Second Edition of the *Canadian Handbook of Practice for Architects* will contribute to improving the practice of architecture and, consequently, help to improve the built environment and architecture in Canada.

The *Canadian Handbook of Practice for Architects* is the result of a great collaborative effort by the architectural profession from every region of the country. This Second Edition of 2009 has been developed and published in both official languages.

Objectives of the Canadian Handbook of Practice

The Handbook is mainly intended for practising architects and those who plan on becoming architects; and in addition, it is also meant for non-architects who want to better understand the profession. With these users in mind, the Handbook's objectives are to:

- provide an instructional resource book for architectural students, intern architects and others;
- establish a reference document to assist architects in Canada by providing concise and current information.

The Handbook includes information and advice, in the form of summaries, lists, checklists, charts, and sample documents, as well as sources of additional reference material.

History

In March of 1974, the Ontario Association of Architects (OAA) initiated the production of a *Canadian Handbook of Practice for Architects*, specifically tailored to Canadian architectural practice. J. Hugh Westren, the Editor of the first edition, was commissioned in June 1974 to start work on a Handbook of national scope. The first edition was published in 1976. In the early 1990s, some revisions were made to a few sections of the Handbook. Many of these revisions were reprinted from information provided by The American Institute of Architects.

In January of 1997, the National Practice Program — an alliance of the ten provincial associations of architects and the Royal Architectural Institute of Canada — appointed a national Editorial Board to direct the creation of a new, updated edition of the *Canadian Handbook of Practice for Architects*. The National Practice Program approved a business plan for this venture in June of 1998 with the development costs being underwritten by every provincial association of architects. Editors were appointed, and the writing and editing of this new edition commenced in the fall of 1998.

In April 2004 the provincial associations of architects assigned the copyright for the *Canadian Handbook of Practice for Architects* and other contract documents for the architecture profession to the RAIC. In the spring of 2008, the RAIC Board of Directors appointed a new Editorial Board to direct the updating of the Second Edition of the *Canadian Handbook of Practice for Architects*. This edition incorporates all of the four supplements issued since the 1999 edition and updates the references. Also, new information is incorporated and advice has been revised to meet current standards of practice. This Second Edition, primarily distributed in electronic format, was published in the spring of 2009.

Format

Volume 1 Theory and Background

Volume 1 is an overview of the architectural profession and architectural practice. The 11 chapters in this section provide theory and background information to the architectural profession and an introduction to the business and professional environment in which an architect works.

Volume 2 Management

Volume 2 is divided into two sections: *Management of the Practice* and *Management of the Project*. Each of the 22 chapters contains instructional and descriptive information as well as checklists and some sample forms for the practitioner to use and modify. Additional forms are provided in CCDC 24: *A Guide to Model Forms and Support Documents* which should be obtained and inserted in Volume 3.

Volume 3 Other Resources

Volume 3 is a binder for architects to file standard documents used by the profession and the construction industry in Canada. For reference purposes, the user should obtain and insert all relevant documents.

In addition, tabs have been provided to permit users to insert information supplied by the provincial or territorial associations of architects and the Royal Architectural Institute of Canada, as well as other relevant reference material.

Improving the Handbook

Our profession and society as a whole are experiencing a rapid rate of change; as a result, the Handbook will require constant revision and improvement.

Your suggestions about information which should be added, or existing material which should be revised, are welcome. Suggestions and comments should be addressed to:

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Thank You's

In my introduction to the first edition I thanked the many writers and editors involved in creating such an important document to assist the architecture profession in Canada. It is very important to thank them once again as their work was the foundation for this Second Edition. The updates and revisions for this Second Edition were directed by a new Editorial Board comprised of D. Gregg Brown, FRAIC, MAIBC; Cathy Capes, MRAIC, OAA; Pierre Corriveau, MIRAC, OAQ; Louis Lessard, MIRAC, OAQ; Rick Linley, FRAIC, MAA; Robert J. Ojolick, MRAIC, NSAA and Barbara Shipman, FRAIC, AAA. I must thank them for the long meetings in Ottawa and for the time they spent in reviewing great volumes of text at short notice. Once again it has been an honour to work with such a great team.

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Canadian Handbook of Practice for Architects



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Building: Résidence Mercille

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Architect: Zeidler Roberts Partnership / Architects
Building: Columbus Center of Marine Research and Exploration
Photographer: Michael Dersin

List of Acronyms used in the Design and Construction Industry

Acronym	Name
AA	Aluminum Association
AAA	The Alberta Association of Architects
AAMA	American Architectural Manufacturers Association
AANB	Architects' Association of New Brunswick
AAPEI	Architects Association of Prince Edward Island
AAPPQ	Association des Architectes en Pratique Privée du Québec
ABET	Accrediting Board for Engineering and Technology
ACE	Architects' Council of Europe
ACEC	Association of Canadian Engineering Companies
ACEQ	Association of Consulting Engineers of Quebec
ACI	American Concrete Institute
ACPA	American Concrete Pavement Association
ACPA	American Concrete Pipe Association
ACSA	Associate of Collegiate Schools of Architecture
ADR	Alternative Dispute Resolution
AECB	Atomic Energy Control Board
AFP	Alternative Funding Plan
AGC	Associated General Contractors of America
AGMCA	Architectural Glass and Metal Contractors Association
AHA	American Hardboard Association
AHRI	Air Conditioning and Refrigeration Institute
AI	Asbestos Institute
AIA	American Institute of Architects
AIAS	American Institute of Architecture Students
AIBC	Architectural Institute of British Columbia
AITC	American Institute of Timber Construction
AMA	Architectural Metals Association
AMCA	Air Movement and Control Association Inc.
ANSI	American National Standards Institute
APA	American Plywood Association

Acronym	Name
APEC	Asia-Pacific Economic Cooperation
API	American Petroleum Institute
APPA	The Association of Higher Education Facilities Officers
APR	Architectural Program Report
ARB	Architects Registration Board (UK)
ARE	Architect Registration Examination
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASINEA	Asociacion de Instituciones de Ensenanza de la Arquitectura
ASME	American Society of Mechanical Engineers
ASPT	Association of Asphalt Paving Technologists
ASTM	American Society for Testing and Materials
AWCI	Association of Wall and Ceiling Industries International
AWI	Architectural Woodworking Institute
AWMAC	Architectural Woodwork Manufacturers Association of Canada
AWPA	American Wire Producers Association
AWS	American Welding Society
AWWA	American Water Works Association
BEEP	Building Envelope Education Program
BREEAM	BRE Environmental Assessment Method
BIA	Brick Industry Association
BIM	Building Information Modeling
BNQ	Bureau de normalisation du Québec
BOMA	Building Owners and Managers Association
BOT	Build-Own-Transfer
BOOT	Build-Own-Operate-Transfer
DBOOT	Design-Build-Own-Operate-Transfer
BSI	Building Stone Institute
CAA	Commonwealth Association of Architects
CABA	Continental Automated Building Association
CACB	Canadian Architectural Certification Board
CAD	Computer-Aided Design or Computer-Aided Drawing
CAEAL	Canadian Association for Environmental Analytical Laboratories Inc.
CAGBC	Canada Green Building Council
CALA	Canadian Architectural Licensing Authorities

Acronym	Name
CASA	Canadian Architecture Students Association
CASA	Canadian Alarm and Security Association
CBAC	Clay Brick Association of Canada
CCA	Canadian Cement Association
CCAC	Committee of Canadian Architectural Councils
CCBDA	Canadian Copper and Brass Development Association
CCBFC	Canadian Commission on Building and Fire Codes
CCCA	Certified Construction Contract Administration
CCDC	Canadian Construction Documents Committee
CCI	Canadian Carpet Institute
CCUSA	Canadian Council of University Schools of Architecture
CECA	Canadian Electrical Contractors Association
CGA	Canadian Gas Association
CGL	Commercial General Liability
CGSB	Canadian General Standards Board
CHBA	Canadian Home Builders' Association
CHOP	Canadian Handbook of Practice for Architects
CICC	Construction Industry Consultative Committee
CIQS	Canadian Institute of Quantity Surveyors
CISC	Canadian Institute of Steel Construction
CITC	Canadian Institute of Timber Construction
CLA	Canadian Lumbermen's Association
CLAS	Calibration Laboratory Assessment Service/NRC
CLSAB	Canadian Lumber Standards Accreditation Board
CMCA	Canadian Masonry Contractors Association
CMHC	Canada Mortgage and Housing Corporation
CNSC	Canadian Nuclear Safety Commission
COFI	Council of Forest Industries
CPCA	Canadian Paint and Coatings Association
CPCA	Canadian Portland Cement Association
CPCI	Canadian Precast/Prestressed Concrete Institute
CPI	Canadian Plastics Institute
CPIA	Canadian Plastics Industry Association
CPM	Critical Path Method
CPMA	Canadian Paint Manufacturers Association

Acronym	Name
CPP	Canada Pension Plan
CRCA	Canadian Roofing Contractors' Association
CRSI	Concrete Reinforcing Steel Institute
CSA	Canadian Standards Association
CSC	Construction Specifications Canada
CSDFMA	Canadian Steel Door and Frame Manufacturing Association
CSI	Construction Specifications Institute
CSLA	Canadian Society of Landscape Architects
CSSBI	Canadian Sheet Steel Building Institute
CTCA	Ceramic Tile Contractors Association
CTR	Certified Technical Representative
CWB	Canadian Welding Bureau
CWC	Canadian Wood Council
CWDMA	Canadian Window and Door Manufacturing Association
DBFM	Design Build Finance Maintain
DCC	Defence Construction Canada
DND	Department of National Defence
EEMAC	Electrical Equipment Manufacturers Association of Canada
EFC	Electro-Federation Canada
EI	Employment Insurance
EIMA	EIFS Industry Manufacturer's Association
EPA	Environmental Protection Agency
EXAC	Examination for Architects in Canada
FBHRO	Federal Building Heritage Review Office
FCARM	La Federacion Nacional de Colegios de Arquitectos de la Republica Mexicana
FCC	Forintek Canada Corporation
FGMA	Flat Glass Manufacturers Association
FIDIC	International Federation of Consulting Engineers
FMEC	Factory Mutual Engineering Corporation
FPAA	Federacion Panamericana de Asociaciones de Arquitectos
FPS	Forest Product Society
GANA	Glass Association of North America
GST	Goods and Services Tax
HVAC	Heating, Ventilation and Air Conditioning
HI	Hardwood Institute

Acronym	Name
HRAI	Heating, Refrigerating and Air Conditioning Institute of Canada
HST	Harmonized Sales Tax
IAP	Intern Architect Program
ICBO	International Conference of Building Officials
ICOGRADA	International Council of Graphic Design Associations
ICOMOS	International Council on Monuments and Sites
ICSID	International Council of Societies of Industrial Design
IDC	Interior Designers of Canada
IDP	Intern Development Program
IPT	Integrated Project Team
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IFI	International Federation of Interior Design
IFMA	The International Facility Managers Association
INTA	International Development Association
IRC	Institute for Research in Construction
ISO	International Organization for Standardization
ISOCARP	International Society of City and Regional Planners
ITS	Intertek Testing Services
JIA	Japan Institute of Architects
KPMG	KPMG Quality Registrar Inc.
LCA	Life Cycle Assessment
LCC	Life Cycle Costing
LEED	Leadership in Energy and Environmental Design
LSGA	Laminators Safety Glass Association
MAA	Manitoba Association of Architects
MCAC	Mechanical Contractors Association of Canada
MNECB	Model National Energy Code for Buildings
MSS	Manufacturers' Standardization Society of Valve and Fittings Industry
NLAA	Newfoundland and Labrador Association of Architects
NAAB	National Architectural Accrediting Board, Inc.
NAAMM	National Association of Architectural Metal Manufacturers
NAFTA	North American Free Trade Agreement
NBC	National Building Code
NCARB	National Council of Architectural Registration Boards (US)

Acronym	Name
NCMA	National Concrete Masonry Association
NEMA	National Electrical Manufacturers Association
NFCA	National Floor Covering Association
NFPA	National Fire Protection Agency
NGA	National Glass Association
NHLA	National Hardwood Lumber Association
NIST	National Institute of Standards and Technology
NLGA	National Lumber Grades Authority
NMS	National Master Specification
NPCA	National Precast Concrete Association
NRC	National Research Council
NRCan	Natural Resources Canada
NSAA	Nova Scotia Association of Architects
NWTAA	Northwest Territories Association of Architects
OAA	Ontario Association of Architects
OAQ	Ordre des architectes du Québec
OGCA	Ontario General Contractors' Association
P3	Public Private Partnership
PCI	Precast/Prestressed Concrete Institute
PERT	Program Evaluation and Review Technique
PMI	Project Management Institute
PST	Provincial Sales Tax
PWGSC	Public Works and Government Services Canada
QMI	Quality Management Institute, a division of CSA
QPP	Quebec Pension Plan
QS	Quantity Surveyor
QUASAR	Quality Systems Assessment Registrar
RAIA	Royal Australian Institute of Architects, now the Australian Institute of Architects
RAIC	Royal Architectural Institute of Canada
RFPs	Request for Proposals
RIBA	Royal Institute of British Architects
SAA	Saskatchewan Association of Architects
SBCCI	Southern Building Code Congress International
SCC	Standards Council of Canada
SGS	SGS International Certification Services Canada Inc.

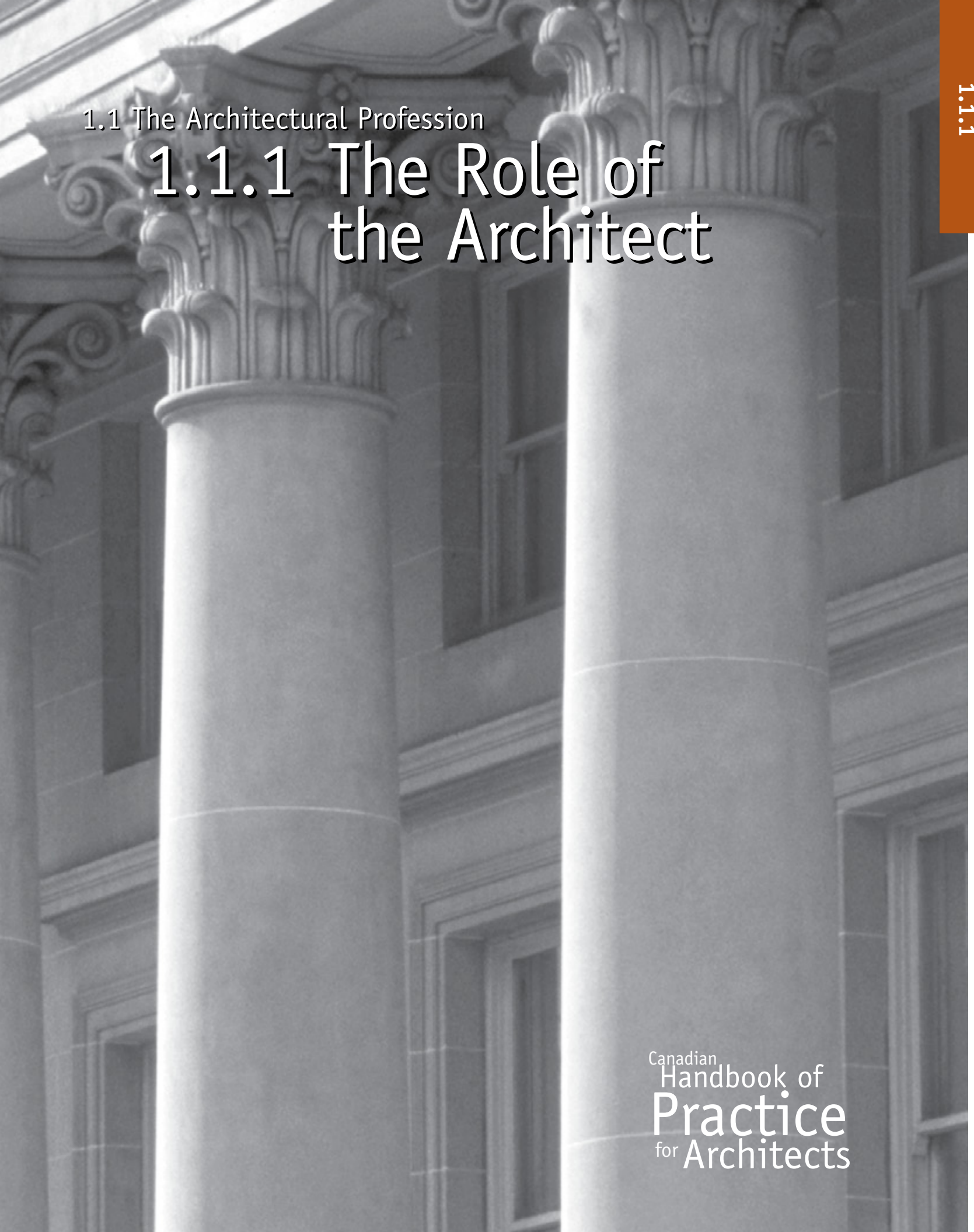
Acronym	Name
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association
TCAA	Tile Contractors Association of America
TIAC	Thermal Insulation Association of Canada
TPIC	Truss Plate Institute of Canada
TQM	Total Quality Management
TTMAC	Terrazzo, Tile and Marble Association of Canada
UDS	Uniform Drawing System
UIA	Union internationale des architectes
UL	Underwriters Laboratories (US)
ULC	Underwriter's Laboratories of Canada
UNCHS	United Nations Centre for Human Settlements
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
WACCA	Walls and Ceilings Contractors Association
WCLIB	West Coast Lumber Inspection Bureau
WDMA	Windows and Door Manufacturers Association
WHMIS	Workplace Hazardous Materials Information System
WHPS	Warnock Hersey Professional Services
WIP	Work-in-Progress
WWPA	Western Wood Products Association

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1.1.1 The Role of the Architect



1.1.1

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The Role of the Architect

The Architect in Society

Challenges and Opportunities for Architects in the 21st Century

Architecture is an evolving and dynamic profession. The role of the architect has evolved over the centuries. Architects have been:

- powerful confidants to the pharaohs in ancient Egypt;
- philosophers/planners in ancient Greece and Rome;
- artisans and craftsmen in medieval times;
- "master builders" throughout the Renaissance.

Today, the architect is usually a professional service provider. Technological and sociological changes have altered both the way architecture is practised as well as the role of the architect in society. Architecture remains an exciting profession and architects continue to shape our built-environment and contribute to society and the planet.

There are several new frontiers in architectural practice which provide exciting opportunities for architects, including:

- sustainable design;
- new forms of project delivery;
- new technologies and tools for architectural practice; and,
- globalization.

Sustainable Design

The ever-increasing consumption of water, raw materials, fossil fuels together with the need to reduce demand for non-renewable resources will impact the future role of the architect and architectural practice.

Architects in Canada are currently leaders in both research and the design of sustainable buildings. In 2002, the Sustainable Buildings Canada Committee of the RAIC was transformed into the Canada Green Building Council and the RAIC provided administrative and financial support for this new organization whose goal is to transform the design and construction market. Today many architects continue to lead and contribute to the work of the Canada Green Building Council and to advancements in sustainable design.

New Forms of Project Delivery

Clients and governments are constantly seeking new ways of financing and more efficient methods to design and construct buildings and infrastructure projects. This has resulted in new and evolving methods of project delivery. Consequently, the architect's professional relationship with clients, users and others in the construction industry is changing. Project delivery methods such as Design-Build and Public Private Partnerships (also known as P3) mean that the architect is often engaged by a builder or a financial entity and not by the owner or users of the building. This presents challenges for the practice of architecture but it also offers opportunities including new roles such as a compliance Architect, advocate Architect, and the possibility of various leadership roles within these new forms of project delivery.

Refer also to Chapter 2.3.2, *Types of Construction Project Delivery*.

New Technologies and Tools for Practice

Computer software and tools used in architectural practice continue to advance and improve. The historical role of the architect to gather information, process and synthesize this information, and use presentation techniques to communicate a solution can benefit significantly from new software and computer tools. There are

opportunities for the architect to expand and develop an architectural practice depending on his or her ability to embrace and integrate these new technologies. As these tools evolve, the potential for architects to prepare more accurate cost estimates and three-dimensional images increases. Furthermore, there are many modeling and simulation software programs available to assist architects in the analysis and evaluation of energy, lighting, daylighting and other factors influencing architectural design. Some architects specialize in the applications of such software. These tools can also facilitate the integrated design process and coordination with engineers, consultants, manufacturers and construction partners. Around the start of the 21st century architects led the way in adopting Building Information Modeling.

Globalization

Architectural practice now extends to all continents and there are many multinational architectural firms established in several countries. This globalization presents new challenges to architects to adapt to different cultures and new markets abroad, as well as coping with competition in the Canadian market from international firms.

The Architect as an Integrator and Generalist

Today, an architect is a professional with a general knowledge of the many disciplines involved in the design, construction, maintenance, and alteration of buildings. An architect must also have the skills necessary to synthesize, integrate and coordinate various parts of a project into a composite whole not only to satisfy functional requirements, but also to contribute to an orderly, visually-pleasing, and sustainable environment. The individual architect may become an expert in particular aspects of design, production or management, or become an expert in a specific building type or undertake non-traditional activities such as teaching, managing or building. There is a growing trend to specialize, such as architects as code consultants or programmers, and to become accredited or certified in specialties such as building envelope consultants (in British Columbia). However, the architect maintains a *general* expertise in all aspects of the profession.

The practice of architecture is interrelated with many other design disciplines, from various types of engineering to landscape design, to sociological and planning studies. In the complex task of coordinating the many specialists involved in a project, the architect develops a unique role and set of skills. Most architects have joined the profession because of a desire to improve the environment in which people live and work. This holistic view of the built environment has enabled architects to undertake a variety of strategic roles in society.

Professional Responsibility

The architect's responsibility extends beyond the client to fellow professionals, the profession, and society in general. The amount of responsibility an architect is prepared to accept will determine how he or she practises architecture. The employed or salaried architect has reduced direct responsibility to his employer's client, whereas the sole practitioner carries the entire responsibility. Architects in partnership share this responsibility. The architect's responsibility varies depending on the architect's role in society. Refer also to Chapter 1.1.3, *ProfessionalConduct and Ethics*, for more information on professional obligations and responsibilities.

Architects in Private Practice

The general public traditionally views the architect as a private practitioner.

> *Architectural Practice is the setting where ethos and circumstances lock horns, where individual and professional goals combine with budgets, deadlines, skills, organization, power, context and regulations.*
> (Cuff)

Architects in private practice may be:

- self-employed;
- employed (salaried) architects working for other professionals;
- independent contractors providing services to other architects;
- specialist consultants in various fields, such as project management, building codes, conservation, and specifications.

Self-employed architects may be:

- sole proprietors;
- in partnership with other architects or engineers;
- directors or shareholders of an architectural corporation.

Self-employed architects in private practice must maintain expertise in two distinct areas:

- the performance of architectural services;
- the operation and management of a practice, including staff.

Refer also to Chapter 2.1.1, *Organization of an Architectural Practice*. The architect in private practice accepts liability for the architectural commissions which the architect undertakes.

Refer also to Chapter 2.1.7, *Human Resources*, for a discussion of employees and independent contractors in the design professions.

Corporate Architects (Private Sector)

Many corporations — that do not practise architecture — employ architects as members of their staff. For example, many large corporations employ architects in their real estate, design, construction, and facilities management divisions. The architect working for a corporation must nevertheless comply with the provincial requirements for practice and the use of the professional seal. Some of these architects may provide a full range of professional services for their employer, the corporation. Alternatively, they may simply manage the design and construction by selecting architects and consultants, and by coordinating the provision of architectural services as a representative of the corporation.

Frequently, corporate architects provide services in:

- site selection;
- project planning;
- programming;
- consultant selection;
- contract negotiations;
- construction contract administration;
- facilities management.

The special skills of the architect who is committed to an organization's culture and goals can result in promotion to the executive levels of an organization.

Architects in Government and Institutions (Public Sector)

The architect can also serve society as a public service worker, that is, as an employee of the government, either at the federal, provincial/territorial or municipal level or for a public institution. Public Sector employees are not personally liable for their professional work to the same extent as their private-sector counterparts.

Often, universities and hospitals require in-house expertise for the management and expansion of their buildings and physical plant. Architects in government and institutions can exert influence and develop policies related to the built environment. Opportunities within the public sector may include positions at a technical, managerial or policy level. All levels of government construct and fund building projects as well as regulate the built environment.

Architects can play a variety of roles within government as noted below. Architects in these roles must be tactful and diplomatic in order to facilitate communication with the general public, officials, other architects, developers, and contractors.

Because many decisions regarding the built environment are made in the political arena, some architects choose to run for office for:

- various levels of government;
- school boards;
- professional or business associations.

Architects employed in government and institutions are not always required to maintain "professional" registration with a provincial or territorial association of architects. The lapse, or absence, of a professional licence can create a distance between the government "professional" and fellow architects, and can lead to a lack of currency and knowledge of the profession. Governments and the profession are working to redress this situation.

Federal

At the federal level, architects work as:

- employees of Public Works and Government Services Canada (PWGSC), Department of National Defence (DND), Defence Construction Canada (DCC), and several other federal government departments;
- conservation architects within the Federal Building Heritage Review Office (FBHRO) and Parks Canada, the guardians of national historic sites;
- researchers within federal government agencies such as the Canada Mortgage and Housing Corporation (CMHC) and the Institute for Research in Construction (IRC) of the National Research Council (NRC);
- technical representatives and policy developers or other officials related to the built environment and building codes.

Provincial/Territorial

At the provincial/territorial level, architects work as:

- employees of various provincial/territorial government ministries, crown corporations, and agencies related to the built environment (for example, education, public works and government services, housing, planning, tourism, health, building codes and regulations, and heritage);
- researchers and technicians;
- policy developers for the provincial/territorial government.

Municipal

At the municipal level, architects work as:

- building inspectors and plans examiners;
- administrators and designers within municipal departments of Planning and Development, specializing in areas such as land-use planning and zoning, urban design, heritage conservation.

Architects in Education and Research

Architects may pursue a career in academia as faculty members at the university schools of architecture or as researchers in a variety of settings. The university schools of architecture in Canada have faculty on a fulltime, visiting or adjunct (part-time) basis. (Refer to "List: Canadian University Schools of Architecture with Accredited Programs," in Chapter 1.1.4, *Admission to the Profession*.)

Some architects who teach also practise the profession or undertake research. Many architects also teach at the various community colleges, technical institutions, and cégeps ("collèges d'enseignement général et professionnelles" in Québec) which train architectural technicians, technologists, and other students who study design and the construction industry.

Architects may be involved in both pure and applied research. Opportunities exist in various government agencies, universities, manufacturers of building products, and with certain specialized institutes of research.

Architects in Construction and Development

Increasingly, architects are selecting careers directly in the construction industry or real estate development. As designers, planners, and managers, they can contribute significant skills to this sector of the economy. Typical careers include:

- developer;
- construction manager;
- contractor;
- Design-Builder;
- real estate agent.

Many developers have their own in-house staff to plan and coordinate the provision of design services for projects, and many building contractors are involved in "Design-Build" work, employing architects directly. The following skill sets can be especially marketable to builders and developers:

- marketing;
- economic feasibility studies;
- conceptual problem-solving;
- design;
- construction planning;
- estimating;
- construction administration.

Architects must confirm with the provincial associations of architects that their services and roles comply with provincial regulations. Architects occasionally lead the development and building process; in fact, the number of architect-led Design-Build firms, particularly in the United States, is growing.

Other Roles for Architects

An architectural education is often valuable for other fields of endeavour. Architects look beyond architecture for careers related to design, planning, and construction, and as specialist consultants. New career opportunities are also available to architects willing to pursue studies in related professions and become specialists with a multi-disciplined background. Some examples include:

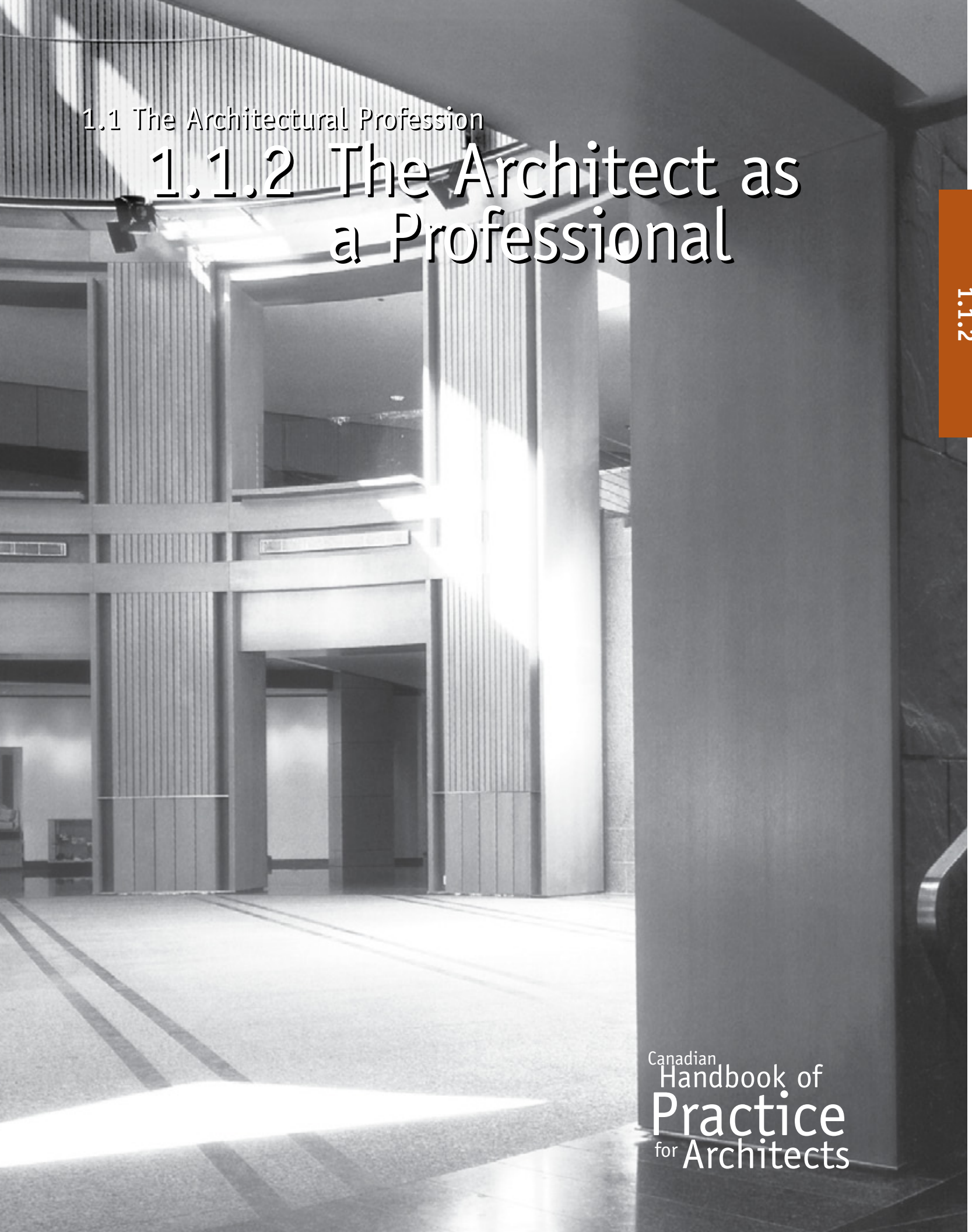
- expert witness;
- architect/engineer;
- architect/planner/urban designer;
- architect/lawyer;
- architect/business administrator;
- architect/facilities planner;
- designer of virtual environments for computers;
- mediator/arbitrator;
- forensic investigator.

Refer to the RAIC website, *Becoming an Architect*, for a list of some of the non-traditional jobs for architects.

References

Cuff, Dana. *Architecture: The Story of Practice*. Boston, MA: Massachusetts Institute of Technology Press, 1991.

1.1.2 The Architect as a Professional



1.1.2

Introduction

Professionalism

Principles of Professionalism
- Expertise
- Autonomy
- Commitment
- Accountability

Professional Liaibility Insurance

Characteristics of Professionals

Architecture as a Profession
- Architecture and Engineering
- The Architect's Seal
- Copyright
- Building Inscriptions
- Non-Professionals and the Built-Environment

Definitions

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The Architect as a Professional

Introduction

> *Membership in any profession, whether law, medicine, teaching, journalism, accounting, or architecture, entails not only the mastery of a body of knowledge and skills but at its best the honoring of a social contract to advance basic human values.*
> (Boyer and Mitgang)

This dedication to advancing the human condition is one aspect which distinguishes professions from other occupations. Public trust is another.

Most professions in Canada, including architecture, are self-governing and self-regulating. The provinces and the Northwest Territories, through enabling legislation (the provincial and territorial architects acts), have established associations which regulate admission to the profession in exchange for safeguarding the public. The provincial and territorial associations of architects are mandated to maintain high standards of practice and ethics among their members.

Refer also to Chapter 1.1.5, *The Organization of the Profession in Canada*.

Professionalism

Historically, the professions were the scholarly endeavours and practices of theology, law, and medicine (the so-called "learned" professions), which had certain principles and characteristics distinct from other vocations. Increasingly, other occupations are adopting some of the principles that these three professions originally exemplified.

Unfortunately, the expression "profession" or "professional" is often misused and overused, and applied to virtually all vocations. This use of the term is an attempt to capitalize on the prestige associated with the original status enjoyed by scholarly professions. Today, the expression does not necessarily represent an adherence to the principles of professionalism.

To be worthy of the term, all professionals must conduct both their personal and business lives according to certain fundamental principles. The International Union of Architects (UIA) has attempted to identify and describe these principles in its *UIA Accord on Recommended International Standards of Professionalism in Architectural Practice*.

Principles of Professionalism

All professionals are required to adhere to the following four principles:

- expertise;
- autonomy;
- commitment;
- accountability.

Expertise

Professionals possess a comprehensive *body of knowledge, skills, and theory developed through education and experience*. The process of professional education, experience, and examination is structured to assure the public that professionals engaged to perform professional services have acquired the expertise to perform them to acceptable standards.

To achieve proficiency, professionals undergo intensive preparation, gaining specialized knowledge in an academic setting. This education is usually followed by some period of training or internship. Because acute judgement is such an essential skill in the provision of services, professionals are required to be proficient, adept, skilled, and expert. While in practice, professionals continue their

personal scholarship, their quest for knowledge, and their growth by experience. In addition, they should be teachers and mentors to those in training for the profession.

Autonomy

Professional practitioners provide *expert advice* to their clients, independent of any self-interest. *Uncompromised professional judgement* should take precedence over any other motive. Professionals are at liberty to exercise discretion, and clients value their judgement and authority. They act independently and accept responsibility for their actions.

Professionals must also embrace the spirit and the letter of the laws governing their professional affairs, and thoroughly consider the social and environmental impact of their professional activities.

Commitment

Professionals bring a high level of *dedication to the work* done on behalf of their clients and society. Members of professions are mandated to serve their clients in a competent and professional manner, and to exercise unprejudiced and impartial judgement on their behalf.

Accountability

Professionals are aware of their *responsibility to provide independent* and, if necessary, *critical advice* to their clients and for the effects of their work on society and the environment. Professionals undertake to perform professional services only when they, together with those whom they may manage or consult, are qualified by education, training or experience in the services offered.

Professionals accept personal responsibility and liability for the consequences of their professional behaviour. Furthermore, professionals are expected to protect not only the primary interest of their clients but also the interest of the public. Professionals must provide and exercise the *standard of care* typical of their profession, but they are not required to have an extraordinary degree of skill.

Professional Liability insurance

The professions vary in their requirements for mandatory professional liability insurance. In jurisdictions where insurance is not mandatory, professionals must consider whether or not to obtain professional liability insurance which will protect them, to a certain extent, from a claim by a client or member of the public as a result of an error, omission or negligence in the provision of professional services.

Under some provincial and territorial statutes of limitations there is a limitation period for bringing an action related to professional services; however, in certain jurisdictions the risk can endure for a lifetime.

Refer to the "Chart: Comparison of Statutes of Limitations in Each Province and Territory" at the end of Chapter 2.1.9, *Risk Management and Professional Liability*.

Characteristics of Professionals

Professionals consistently act with integrity and competence by adhering to the principles of professionalism. Moreover, professionals:

- *are organized through a membership registration* process for the purpose of setting standards for admission, ethics, and practice. An oath of service to the public interest is frequently required as a condition of entry to the profession;
- *set protocols for disciplining* members whose conduct does not meet professional standards or a prescribed code of conduct;
- often earn *respect* in the community;
- *share knowledge* within their profession and engage in *lifelong learning*;
- *develop specializations*, and often become expert in particular fields;
- have a *strong personal identification with the profession* and altruistic concerns for society;
- are usually *highly creative and innovative* in their research, academic pursuits, and practice, valuing discovery, invention, and expression;
- *test, challenge, and push all boundaries and parameters of the profession* in order to advance the profession's scholarly and technical capabilities.

Architecture as a Profession

Architecture, which has been described as a social art (and also an artful science), is the sole profession whose members are qualified to design and to provide advice, including technical and aesthetic judgement of the built environment. Architects provide services and solutions with technical competence and aesthetic sensitivity suitable to the physical, social, cultural, and economic environment, thereby inspiring the community and its citizens. In matters of public health and safety, architects are obliged to serve the public interest and respond to the public need. The concepts of health and safety are expanding to encompass the sustainability of the global environment and accessibility for all persons.

The four generic principles of professionalism previously outlined in this chapter apply to architecture. But what distinguishes architecture from other professions? In the broadest of terms, architecture is the profession which endeavours to identify the public need, and to serve the public interest, in matters relating to the built environment. In this context, architecture is environmental design; in fact, any manipulation of the physical environment is of potential interest to architects. Other disciplines, such as landscape architecture, share in the design of the built environment.

The practice of architecture is usually broader than the regulations governing the profession. However, legislation formalizes a specific relationship between the profession and society by setting certain regulations which limit and define membership and practice. An architect's proficiency may extend well beyond the requirements of registration/licensure — particularly after extensive experience. For example, although a statute or regulation may not define "urban design" or single-family house design as architecture, most architects would agree that it is, to a significant degree, an architectural endeavour. Not including urban design in its legislation demonstrates a jurisdiction's decision to regulate only a certain portion of architecture which it deems to be the "profession of architecture" under its legislative authority.

Although the "practice of architecture" is defined in each provincial or territorial architects act, there is no standard definition for this term. The UIA has proposed an all-encompassing definition (refer to the definition of the **"Practice of Architecture"** at the end of this chapter).

The profession's academics and philosophers are not limited or constrained in their definition of architecture, whereas practitioners face the reality and limitations of licensure and regulation. Such a divergence is healthy and encourages:

- pushing both practical and scholastic architectural limits;
- opening new opportunities;
- discovering unrecognized public needs.

Architecture and Engineering

Almost all architects work closely with professional engineers who form part of the design team. Professional engineering adheres to the principles of professionalism and is regulated in a manner similar to architecture. In Canada, most jurisdictions have legislation to identify which professional services or building types fall under the authority of architecture or engineering.

The differences between the professions of architecture and engineering can be summarized as follows:

- the educational background required for architecture is more diverse than it is for engineering;
- the experience requirement is more wide ranging for architects and more specific for engineers;
- the architect is expected to understand, assemble, and coordinate all of the building disciplines, whereas the engineer usually specializes in one discipline;
- the architect should be involved in all buildings and environments for human habitation and occupancy, but architects are often not involved in other structures requiring engineers, such as warehouses and bridges;
- the architect is involved not only in the building design but also is concerned about the impact of a building or buildings on the character of a community;

- architects have traditionally filled the role of the prime professional responsible for managing and coordinating a project.

The Architect's Seal

An important symbol and tool of the architectural profession is the architect's seal. An architect's seal is a professional seal and not a business seal. The seal must be applied to certain documents prepared by the architect (or Holder of a Certificate of Practice). Issued by the provincial or territorial association, the seal assures the public and Authorities Having Jurisdiction that they may rely on these documents with confidence. For information on the proper application of the professional seal, refer to the Provincial or Territorial Association Practice Bulletins and to "Charts: Comparison of Practice Requirements of Each Provincial and Territorial Association" at the end of Chapter 1.1.5, *The Organization of the Profession in Canada*.

Copyright

All artistic works — including music, photography, paintings, drawings, artistic crafts, and architectural designs — are intellectual property belonging to their creator. In Canada, a copyright does not have to be registered. It rests automatically with the author, and so does the responsibility to demonstrate any ownership of copyright by the author. The *Copyright Act* protects the architect's designs and drawings from unauthorized use or copying. The ownership of the copyright rests with the architect unless the architect assigns it in writing to someone else. Architects are advised to retain ownership of the copyright in all instances. Copyright protection is also provided in the Standard Forms of Agreement. Refer to General Conditions in the RAIC Document Six - *Canadian Standard Form of Contract Between Client and Architect*.

Refer also to Appendix A, Digital Copyright and Architects, in Chapter 2.3.7, *Construction Documents - Drawings*.

Building Inscriptions

Occasionally, the architect will arrange for the installation of a permanent inscription on a building, which may identify the construction date, owner, architect, and builder. Traditionally, a cornerstone was used; however, today, other suitable signs or inscriptions are provided on the permanent fabric of the building.

Non-Professionals and the Built-Environment

It is important, especially for the public and for clients, to understand that there are many other disciplines that provide services for design and construction and that these individuals are not regulated professionals. Architects and engineers are regulated by provincial and territorial statute which provides both title protection and a scope of practice. Other non-professionals may provide services under a limited scope of practice and they may not have the same accountability as professionals. Some of these non-professionals include architectural technicians and technologists, cost consultants, construction managers and designers.

In the province of Québec however, technologists are regulated under the Office des professions.

Definitions

Architect: A person or entity registered, licensed or otherwise authorized exclusively to use the title "architect" and to practise architecture in a province or territory.

Practice of Architecture: The practice of architecture consists of the provision of professional services in connection with town planning as well as the design, construction, enlargement, conservation, restoration or alteration of a building or group of buildings. These professional services include, but are not limited to: planning and land-use planning; urban design; provision of preliminary studies, designs, models, drawings, specifications, and technical documentation; coordination of technical documentation prepared by others (consulting engineers, urban planners, landscape architects, and other specialist consultants) as appropriate and without limitation; construction economics; contract administration; monitoring of construction (referred to as supervision in some countries); project management. (*UIA Accord on Recommended International Standards of Professionalism in Architectural Practice)*
Note: also refer to each provincial architects act for a legal definition.

Profession: A vocation or calling, especially one that involves some branch of advanced learning or science.
(adapted from the *Oxford Dictionary*)

References

American Institute of Architects (AIA). *The architect's handbook of professional practice – Chapter 1 – Professional Life*. 14th edition. Hoboken , New Jersey: AIA, 2008.

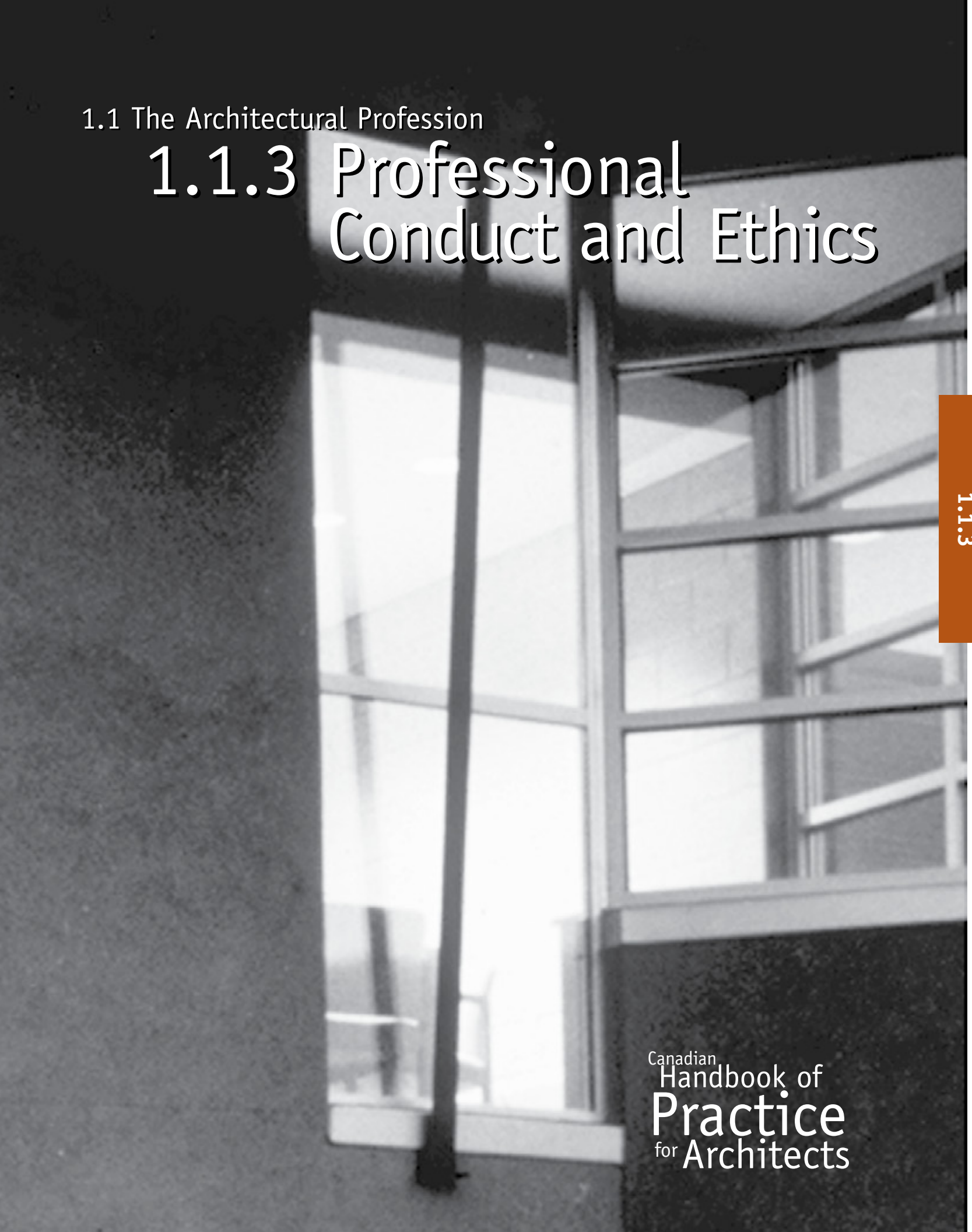
Belfall, Donald. *Professions in Transition*. Toronto: Canadian Society of Association Executives, 2008.

Boyer, Ernest L and Mitgang, Lee D. *Building Community: a new future for architecture education and practice: a special report*. Ewing, NJ: California Princeton Fulfillment Services, 1996.

International Union of Architects (UIA). *UIA Accord on Recommended International Standards of Professionalism in Architectural Practice*. Paris, France: adopted by the UIA in June 1999. *www.uia-architectes.org/image/PDF/UIA-Accord%20full_def.pdf*

National Council of Architectural Registration Boards (NCARB). *Architecture As It Differs From Engineering*. Washington, D.C.: NCARB, April 1995.

1.1.3 Professional Conduct and Ethics



Canadian Handbook of Practice for Architects

1.1.3

Introduction

The Role of the Provincial and Territorial Associations of Architects

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- Competence
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- Compliance with Laws
- Professional Conduct

Professional Conduct and Ethics

Introduction

Being a professional means having a high level of knowledge and skills; meeting certain standards of professionalism, integrity, and competence; and abiding by codes of conduct and ethics. Professional responsibility forms the basis of ethical behaviour. Like other professionals, architects are responsible to the public, their clients, their fellow professionals, and the environment. Architects are also duty-bound to ensure the continuation of the profession. This chapter will briefly discuss codes of conduct and ethics for the architectural profession in Canada.

The Role of the Provincial and Territorial Associations of Architects

Conduct is behaviour. The criteria for acceptable and unacceptable behaviour of an architect are set out in the architects acts and the subsidiary bylaws and regulations of each province. When an individual becomes registered or licensed as an architect, he or she assumes certain professional rights and obligations. In most jurisdictions in Canada, each applicant declares in writing (and in some provinces, the architect must swear an oath) to uphold the profession's standards of conduct, sometimes by reference to the architects act of the province or territory. The architects act and its subsidiary bylaws or regulations codify the rules of conduct for architects.

The provincial or territorial architects act (or the Professional Code in Québec) authorizes a provincial or territorial association of architects to regulate its members by empowering the association to:

- set *eligibility criteria* for becoming an architect;
- set *conduct regulations* for architects;
- investigate and adjudicate allegations of an architect's *professional misconduct*;
- *discipline* an architect it judges to be guilty of misconduct.

Refer to Chapter 1.1.4, *Admission to the Profession*, for a discussion of the criteria or requirements for becoming an architect.

Each of the architects acts is worded differently and reflects the unique customs and history of the architectural profession in that province or territory. Nonetheless, the acts and regulations are similar regarding architects' rights and obligations and disciplinary procedures. An architect who does not comply with a conduct requirement (sometimes called "professional misconduct") might be reprimanded, fined, or have his or her licence temporarily suspended or permanently revoked.

Regulations

The existing bylaws or regulations in each province or territory can be broadly sub-divided as follows:

- *Ethical Regulations or Codes of Ethics*
  (those rules that assist in maintaining the public trust in the integrity of the profession)
  Examples include rules requiring behaviour that exemplifies traits of personal character such as honesty, impartiality, and respect for the law. Ethical principles are fundamental to all the rules and regulations. For example, honesty is implicit in the requirement that an architect shall not knowingly make a false representation.

- *Regulations regarding Competency*
  (those rules that ensure the proper provision of architectural services to the public)
  Examples include rules about the standard of

care that shall characterize an architect's advice or service; rules about the architect's supervision of staff; and rules about the application of an architect's seal.

- *Administrative Rules and Regulations* (those rules that assist in the efficient operation of the provincial or territorial association)
  Examples include: rules about the timely payment by an architect of annual membership fees; procedures for election to the association's council; procedures for changing a bylaw or regulation; and rules that require an architect who is aware of an apparent violation of the architects act to report it to the association.

Many rules of conduct stem from moral customs. They regulate the manner in which an architect relates to others, for example:

- rules against offering or receiving bribes;
- rules against violating laws and building regulations;
- rules that require impartial professional judgement regardless of an architect's personal interests.

It should be noted that ethical codes in architectural practice evolve and adjust to changing societal standards and expectations. For example, in the past, professional misconduct by architects included:

- engaging in construction management or construction;
- advertising their own practices.

In most jurisdictions, and subject to certain qualifications, these actions are now considered acceptable in architectural practice.

Those provinces with societal, legislative, or cultural changes and those with high rates of growth and immigration have tended to periodically update their rules, sometimes comprehensively, so that conduct requirements remain clear to an expanding and increasingly diverse membership.

Codes of Ethics and Professional Conduct

As indicated above, most rules of conduct are found in the various acts, regulations, and bylaws of the provincial or territorial associations of architects. However, consolidating rules about competence and ethical conduct into a separate publication has a number of advantages:

- they can be readily referenced and understood;
- architects do not have to search for conduct rules among all other bylaws, articles of the architects act, and council rulings;
- it provides the context conducive to a full understanding of individual rules.

The National Council of Architectural Registration Boards (NCARB) — the U.S. organization that sets standards, including standards of professional conduct for architects — has developed a model *Rules of Conduct* and has encouraged its adoption by its state Member Boards. The Architectural Institute of British Columbia (AIBC) has developed its own *Code of Ethics and Professional Conduct*, based on the NCARB model. The Saskatchewan Association of Architects (SAA) has adopted a similar code to that of the AIBC in its Bylaw No. 15. For a summary of these two codes of ethics and professional conduct, see the Appendix at the end of this chapter.

In addition, the International Union of Architects or Union internationale des architectes (UIA), through its Professional Practice Commission, has developed *Recommended Guidelines for the UIA Accord on Recommended International Standards of Professionalism in Architectural Practice — Policy on Ethics and Conduct*, intended as a model code for the UIA member sections. The Code of Ethics of the Ordre des architectes du Québec (OAQ) is similar in format to the UIA document.

The model code, which has been adapted for use by the AIBC and the SAA, is organized into the following subject areas:

- competence;
- conflict of interest;
- full disclosure;
- compliance with laws;
- professional conduct.

The UIA model is organized under these headings:

- *General Obligations* (requirements to achieve and maintain competency);
- *Obligations to the Public* (requirements to ensure that professional affairs respect social standards and the environment);
- *Obligations to the Client* (requirements to ensure proper professional service and judgement);
- *Obligations to the Profession* (requirements to uphold and respect the dignity of the profession);
- *Obligations to Colleagues* (requirements to respect professional colleagues).

Complaints and Discipline Proceedings

The provincial and territorial associations of architects have established similar procedures for reprimanding or punishing architects who are guilty of professional misconduct. Most associations have standing committees which investigate formal complaints against members or practices. If the complaint is found to be valid, the matter is typically referred to another committee — a "discipline committee," as it is called in most associations.

In some provincial and territorial associations, the Discipline Committee may hold a hearing concerning conduct of the members referred to it. The Discipline Committee is also responsible for setting punishment for architects who are found guilty of contravening the architects act, regulations or bylaws. Disciplinary hearings are quasi-judicial proceedings and therefore must follow due process of law. The association and the architect accused of professional misconduct are sometimes represented by legal counsel. Typically, the findings of a discipline committee and its punishments are published and distributed to the membership at large. Such publication has the following benefits:

- reinforcing the prevailing ethical standard;
- demonstrating to society that the profession is exercising its mandate;
- providing a deterrent against unprofessional conduct by other architects;
- delivering continuing education to architects to refresh their knowledge on matters of conduct.

Definitions

Code: A set of rules, or systematic collection of statutes or body of laws arranged to avoid inconsistency and overlap; standard of moral behaviour.

Complaint: Formal written accusation or statement of grievance.

Discipline: Order maintained among members of a profession; control exercised over members of an organization; chastisement.

Ethics: Moral principles or rules of conduct.

References

International Union of Architects (UIA). *Recommended Guidelines for the UIA Accord on Recommended International Standards of Professionalism in Architectural Practice — Policy on Ethics and Conduct.* Paris, France: UIA.

National Council of Architectural Registration Boards (NCARB). Washington, D.C. *Professional Conduct.* Washington, D.C. 2000

Provincial and Territorial Associations of Architects:

Architectural Institute of British Columbia, *Code of Ethics and Professional Conduct*, December 2002: Revision #2: February 2004.

Alberta Association of Architects, *Architects Act*, RSA 2000, Chapter A-44, and the *Architects Amendment Act*, 2006 (passed but not yet brought into force). *Code of Ethics*, A.R. 240/1981

Saskatchewan Association of Architects, Bylaw No. 15, *Code of Ethics and Professional Conduct*, August 1997.

Manitoba Association of Architects, General By-law, Article Fifteen, *Professional Ethics and Conduct*, May 10, 2008.

Ontario Association of Architects, *Regulation 27* under the *Architects Act*, Section 42 (describing professional misconduct), 1990.

Ordre des architectes du Québec, *Regulation Respecting the Code of Ethics*, July 18, 1991.

Architects' Association of New Brunswick, General By-law No. 15, *Professional Misconduct*, as amended 1990.

Nova Scotia Association of Architects, *Architect's Act*, 1975; Regulations Pursuant to the Architect's Act; *Code of Ethics and Professional Conduct*, 1998.

Architects Association of Prince Edward Island, *Code of Ethics*, 1978.

Newfoundland Association of Architects, *Code of Professional Conduct*, October 4, 1989.

Northwest Territories Association of Architects, General By-Law, *Code of Ethics*, Revised March 2008.

Appendix — *Summary of Code of Ethics and Professional Conduct* of The AIBC and SAA

The following is a summary of the Code of Ethics and Professional Conduct from the AIBC (Architectural Institute of British Columbia) and the SAA (Saskatchewan Association of Architects) which is based on the model developed by NCARB (National Council of Architectural Registration Boards).

Competence
Regulations governing competence are based on the assumption that the end result of an architect's services — a building — shall be fit, in all applicable regards, for its intended purposes. These rules state that:

- architects must provide reasonable care, competence, knowledge, skill, and judgement to clients and the public;
- architects' consultants must be similarly competent;
- architects must not undertake to provide services beyond their personal competence.

The test of competence is if another architect, being reasonable and prudent, would have provided similar services at the same time and place. When a provincial association receives a complaint of incompetence against one of its members, it may respond through an evaluation of the architect's services by his or her peers. If they find incompetence, then the architect could be subject to penalties imposed by the association. The aim is to protect the public from further incompetence by ensuring that the architect either raises his or her skills and services to prevailing professional standards or, failing this, stops practising.

Conflict of Interest
Architects must avoid actions and situations in which their personal interests conflict, or appear to conflict, with professional obligations to the public, the client, and others. Rules about conflict of interest include the following:

- An architect shall be compensated by only one party on a project except when the other interested parties agree in writing to another arrangement.
- An architect with a personal association or interest in a project shall disclose this in writing to the client or employer. If they have objections, then the architect must either terminate the association or interest, or offer to give up the commission or employment.
- An architect shall not solicit or accept compensation or benefits from suppliers in return for specifying or endorsing their products, except as permitted.
- An architect acting as an interpreter of construction contract documents and reviewing construction for conformance with the contract documents shall render decisions impartially.
- An architect may be a project's owner. An architect may also be the constructor of a project of the architect's own design. In such cases, the architect shall:
  - disclose any interest in writing to the other contracting parties and the Authority Having Jurisdiction;
  - receive their written acknowledgement;
  - provide professional services as if disinterested.
- An architect who is a juror or advisor to an approved competition shall not subsequently provide services to the winner or, if there is no winner, receive any commission deriving from the competition.

Full Disclosure

This principle refers to an architect's obligation to accurately represent the full truth. For example:

- An architect shall disclose all related personal or business interests when making a public statement on an architectural issue.
- An architect shall accurately represent to the public, prospective or existing client or employer the qualifications and scope of responsibilities in connection with work for which the architect is claiming credit.
- If an architect becomes aware that the employer or client is acting against professional advice and violating applicable building regulations, the architect shall:
- refuse to consent;
- report the action to the Authority Having Jurisdiction;
- terminate services on the project.
- An architect shall not knowingly make or assist others to make a false or misleading statement or omission of material fact about education, training, experience or character when applying for or renewing registration as an architect.
- An architect who knows of an apparent violation of the architects act, bylaws, or council rulings shall report such knowledge to the association.
- An architect who has a financial interest in a building product or device which the architect proposes to specify for a project shall disclose this to the client, receive the client's written approval, and include a copy of the client's approval in the construction documents.

Compliance with Laws

An architect must respect and comply with laws and regulations. For example:

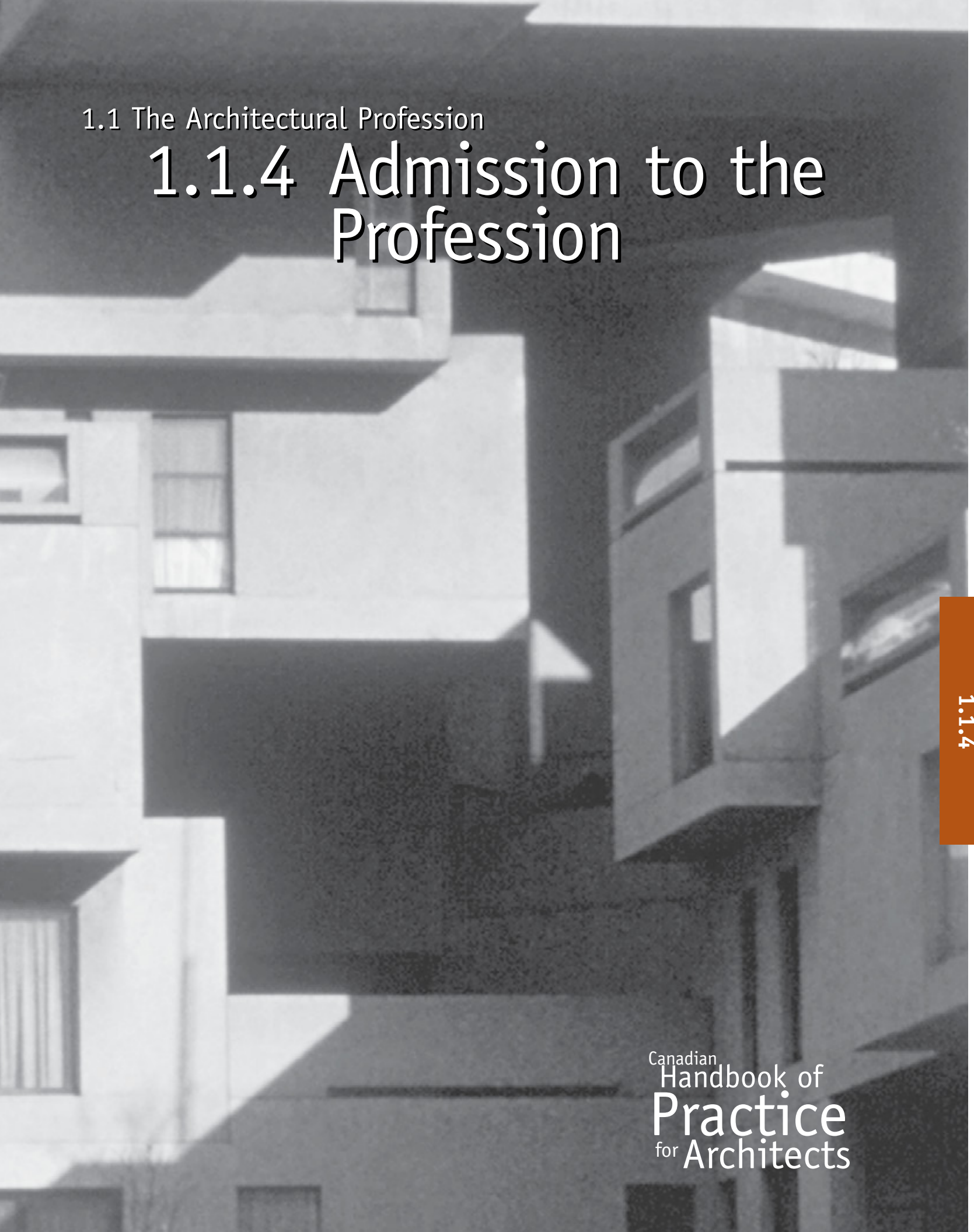
- In the practice of architecture, an architect shall not knowingly violate any law or regulation.
- An architect shall neither offer nor make payment or gift to a public official (elected or appointed) with the intent of influencing the official's judgement in connection with a prospective or existing project.
- An architect shall comply with the relevant architects act and its bylaws and council rulings.
- In the practice of architecture, an architect shall take into account all applicable federal, provincial, and municipal building bylaws and regulations. The architect may rely on the advice of other professionals and qualified persons as to the intent and meaning of such regulations.

The above sections summarize the principles in the AIBC and SAA Codes of Conduct, plus additional requirements of many other Canadian provincial associations.

Professional Conduct

This section includes rules based on principles that are not covered in the preceding sections, as well as rules that may not be conduct requirements in every province. Examples of such conduct requirements include:

- the supervision of an architectural office by an architect;
- the use of the architect's seal;
- the prohibition of the following acts:
  - offering gifts other than of nominal value to a prospective client;
  - committing fraud or having wanton disregard for the rights of others;
  - performing any act that would reflect unfavourably on the profession;
  - falsely or maliciously injuring another architect's reputation or business prospects;
  - attempting to supplant another architect after the other has been retained or is in the process of being retained;
  - accepting the same commission as another architect before the other has been dismissed;
- the requirement to:
  - comply with competition rules approved by the Council of the provincial association;
  - promptly distribute monies received for others;
  - comply with the provincial association's performance standards together with appropriate fees for services.



1.1 The Architectural Profession

1.1.4 Admission to the Profession

1.1.4

Canadian Handbook of Practice for Architects

1.1.4

Introduction

Education
- Role of the Canadian Architectural Certification Board (CACB)
- Canadian Education Standard
- Professional Degree Programs in Architecture
- Accreditation of Professional Degree Programs
- RAIC Syllabus (RAIC Center for Architecture at Athabasca University)

Experience
- Intern or Intern Architect Program
- Role of Employers
- Role of Mentors
- Experience Categories

Examination for Architects in Canada (ExAC) and the Architect Registration Examination (ARE)

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- Procedure
- Reciprocity Agreement Between Canadian Architectural Licensing Authorities
- Inter-Recognition Agreement Between the NCARB and the former CCAC
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List: Canadian University Schools of Architecture with Accredited Programs

Admission to the Profession

Introduction

Canada's provincial governments have jurisdiction over professional practice. This responsibility is entrusted by legislation to various provincial professional associations, which regulate members of their respective professions for the protection of the public. Provincial and territorial associations of architects, sometimes referred to as the licensing authorities, have established admission requirements and standards to ensure that candidates are competent to practise architecture.

The ten provincial associations of architects and the Northwest Territories Association of Architects have adopted common admission standards, which involve:

- education or training in architecture;
- experience, or workplace internship;
- examination.

These three components may overlap, to the benefit of the student or intern. For example, internship experience acquired during an academic program enables students to better appreciate and understand the concepts being taught. Writing certain sections of the Examination for Architects in Canada (ExAC) or the Architect Registration Examination (ARE) permits the intern to apply or demonstrate knowledge, skills, and abilities acquired during internship.

Education

Role of the Canadian Architectural Certification Board (CACB)

The provincial and territorial associations of architects have entrusted the Canadian Architectural Certification Board (CACB) to:

- certify the academic qualifications of candidates;
- accredit programs offered by Canadian university schools of architecture.

The CACB is a not-for-profit organization representing both licensing authorities and architectural educators.

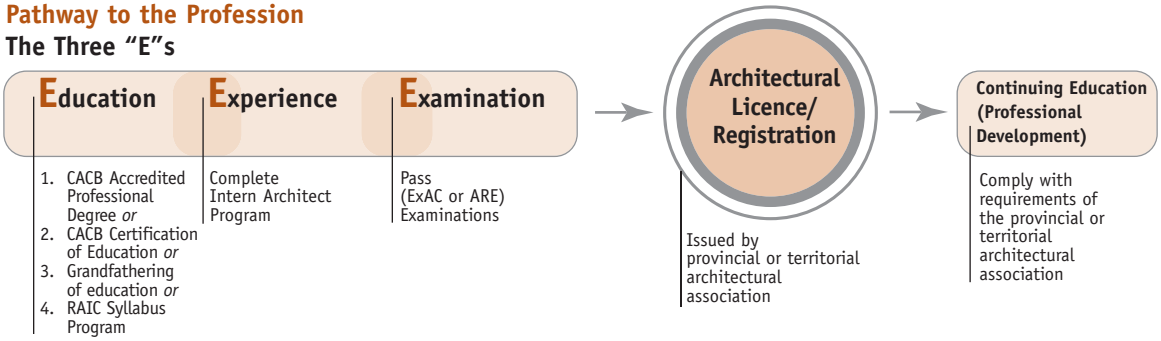
Canadian Education Standard

The associations of architects have developed "Conditions and Procedures for the Certification of Educational Qualifications required for Admission (Registration or Licensing) to Provincial and Territorial Architectural Associations in Canada". This document prescribes various educational requirements in detail including the length, structure and content of courses which must be fulfilled to receive a professional degree in architecture.

Individuals can satisfy the requirements of the Canadian Education Standard in four ways:

Pathway to the Profession

The Three "E"s



- *Accredited Degree*

by obtaining a professional degree (master's degree in Canada) from an architecture program accredited by the CACB or its U.S. counterpart organization, the National Architectural Accrediting Board, Inc. (NAAB);

- *Certification of Education*

by submitting the academic record of a non-accredited degree for evaluation according to the education requirements outlined in the Canadian Education Standard (candidates who have completed all or part of their post-secondary studies outside Canada must provide a statement regarding the equivalency of the courses; candidates whose records do not meet the requirements may upgrade their training by taking appropriate courses or workshops);

- *Grandfathering*

through registration or licensing by a provincial association of architects prior to July 1, 1976; or, for the province of Québec, registration/ licensing by the Ordre des architectes du Québec prior to 1992; or, for the province of Alberta, certification by the Universities Co-ordinating Council;

- *RAIC Syllabus (RAIC Centre for Architecture at Athabasca University)*

by obtaining a diploma from the Royal Architectural Institute of Canada (RAIC) Syllabus Program (a workplace program, supplemented by courses and examinations).

Professional Degree Programs in Architecture

University programs in architecture provide training which includes critical analysis and integration of knowledge.

Analytical study (theoretical courses) provides general knowledge required to undertake the design and construction phases involved in the development of the built environment. Subject areas include:

- history;
- behavioural psychology;
- socio-cultural studies;
- programming;
- building sciences;
- construction;
- regulations;
- safety;
- structures;
- electrical and mechanical services;
- quantity surveying;
- environmental assessment.

Integration (design studios) enables students to develop their creativity and gain the necessary self-reliance to make responsible architectural decisions. Students learn to generate outcomes by putting together the various, and sometimes conflicting, requirements that are unique to each project.

Canadian programs are currently offered at both the bachelor level (B.Arch.) and the master's level (M.Arch.); however, the professional degree is being granted only at the master's level. Programs may last from five to seven years.

Accreditation of Professional Degree Programs

To obtain accreditation from the CACB, all professional degree programs must demonstrate, through an Architecture Program Report (APR), that they follow certain procedures and meet certain criteria, including the "student performance criteria." A CACB Visiting Team travels to each school to verify the accuracy of the APR. The team also assesses examples of students' work against the student performance criteria and recommends whether to accredit the program.

Programs may be granted accreditation for two, three or five years depending on the fulfilment of CACB conditions.

RAIC Syllabus (RAIC Centre for Architecture at Athabasca University)

The RAIC Syllabus program was recently restructured and this work-study program will now be delivered and administered through Athabasca University, a university that specializes in distance education. The renewed Syllabus Program at Athabasca University provides an alternative path for those individuals who cannot undertake a full-time university program. The program offers a B.Sc. (Architecture) and a professional diploma - the Graduate Diploma in Architecture.

The RAIC Syllabus new mission is "to provide an inclusive and accessible professional architectural education according to rigorous standards of excellence that lead to Canadian professional certification. The bilingual program is to be made available nationally according to a financially sustainable model, through varied study opportunities exploiting available technologies and managed work experience."

Experience

Intern or Intern Architect Program

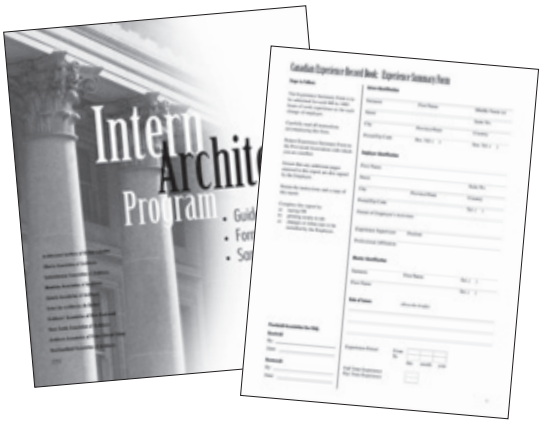
The objective of internship prior to licensing/ registration is to ensure that the candidate gains enough experience to:

- meet generally recognized standards of practical skill;
- practise architecture in a way that protects the health and safety of the public.

The provincial and territorial associations of architects established the Internship in Architecture Architect Program (IAP). The IAP is a standardized, national system for periodic documentation and evaluation of internship activities. It provides a structured transition between formal education and registration/ licensing. In addition, the program encourages experienced practitioners to become more involved in the development of their future colleagues.

Candidates are advised to register for the IAP with their provincial or territorial architectural association as soon as they are eligible. Eligibility occurs after candidates have completed:

- at least 50% of an accredited professional architecture degree program;
- Part 1 of the RAIC Syllabus or 50% of the graduate diploma in architecture.



Procedures are described in the IAP Manual which includes:

- guidelines;
- forms;
- sample letters;
- the Canadian Experience Record Book, a requirement for recording work experience.

On application, candidates must complete the appropriate form to confirm the names of employers (or the equivalent) and mentors.

The Canadian Experience Record Book is also available on the RAIC website as an interactive form to be completed and printed for submission to the licensing authorities by interns.

Role of Employers

Employers direct and supervise interns on a daily basis, assess the quality of their work, and certify the intern's documentation of work experience. Architects usually serve as employers, but other professionals involved in the built environment are sometimes permitted to perform this supervisory role.

Role of Mentors

The mentor is an architect selected by the intern. The mentor meets with the intern to regularly review the progress of the intern's experience and to discuss his or her career goals and broad professional issues.

Experience Categories

The Intern Architect Program requires interns to complete a total of 5,600 hours of experience (over a minimum of two and a half years) in the following categories:

Categories	Minimum required hours
Design and Construction Documents	2,800
Construction Administration	560
Management	280

Categories	Total hours permitted
Related Activities	80
Discretionary	1,880

The licensing authorities or provincial and territorial associations are currently reviewing these requirements.

Examination for Architects in Canada (ExAC) and the Architect Registration Examination (ARE)

Over the years, some provincial associations of architects have used various admission examinations to determine whether candidates were competent to be licensed.

Recently, the licensing authorities have developed a new Examination for Architects in Canada (ExAC) to test the minimum standards of competency acquired by an Intern during the Internship period, to ensure both public safety and the professional and skilled delivery of architectural services.

The ExAC, which is composed of four sections, covers the following topic areas as set out in the Internship in Architecture Program:

- Programming
- Site and Environmental Analysis
- Cost Management
- Coordinating Engineering Systems
- Schematic Design
- Design Development
- Final Project
- Bidding and Contract Negotiations
- Construction Phase – Office
- Construction Phase – Site
- Project Management
- Code Research

The principal sources of the examination content are the:

- Internship in Architecture Program (IAP)
- Canadian Handbook of Practice for Architects (CHOP)
- National Building Code 2005 edition

Nevertheless, the provincial and territorial associations will continue to recognize the Architect Registration Examination (ARE), administered by the U.S. National Council of Architectural Registration Boards (NCARB) to ensure that reciprocal licensing for architects is possible throughout North America.

The ARE, which is administered in computer format only, is sub-divided into seven divisions which may be written in any order and at any time at various testing centres in Canada and the United States.

Interns must obtain both of the following from their association of architects:

- "Authorization to Test" (the necessary permission to write the examinations);
- examination results.

Licensing/Registration

Procedure

After successfully completing the three common admission requirements (education, experience, and examination), interns may apply for professional licensing/registration to the architectural association of the province or territory in which they intend to practise. The intern will be granted a licence, renewable on payment of annual dues, providing that the architect complies with the association's bylaws and code of ethics.

Some provincial associations have additional requirements such as attendance at admission courses and/or an oral examination. These additional prerequisites to licensing/registration are available from the provincial or territorial association of architects.

In Québec, French is the official language by virtue of the Charter of the French Language and it is the language used by the Ordre des architectes du Québec (OAQ) in all communications. However, a member may request the OAQ to correspond in English. Whoever becomes a member of the OAQ must demonstrate working knowledge of the French language; therefore, a written or oral examination administered by the Office de la langue française may be required.

[Note: Most licensing authorities, distinguish between the terms "registered (licensed) architect" and "Certificate of Practice." The Certificate of Practice is an additional permit required before providing or offering architectural services to the public.]

Reciprocity Agreement between Canadian Architectural Licensing Authorities

All provinces and the Northwest Territories have adopted common admission standards. The Canadian Education Standard, the Internship in Architecture Program, and the generalized use of the Examination for Architects in Canada (ExAC) or the Architect Registration Examination (ARE) have made admission to the profession virtually identical across Canada. This resulted in a "reciprocity agreement" between the Canadian provincial and territorial associations of architects, which facilitates mobility from one jurisdiction to another.

Specific requirements, mainly related to the unique circumstances of a province, must still be fulfilled (for example, the use of French in Québec, or knowledge of "Philosophy of Seismic Design" in British Columbia).

Inter-Recognition Agreement Between the NCARB and the former CCAC

The Canadian architectural profession was the first profession to negotiate an agreement with its counterparts in the United States under the North American Free Trade Agreement (NAFTA). The accord is called the Inter-Recognition Agreement Between the National Council of Architectural Registration Boards (NCARB) and the former Committee of Canadian Architectural Councils (CCAC). The common admission standards in both countries were contributing factors in reaching this agreement. The commonalities are as follows:

- The CACB's accreditation conditions and procedures are similar to those of the U.S. National Architectural Accrediting Board, Inc. (NAAB). Both organizations recognize programs accredited by each other. Certain details related to Canadian political and demographic features are different.
- The Internship in Architecture Program's objectives, procedures, and duration are similar to those of the Intern Development Program in the United States.
- The Architect Registration Examination (ARE) is identical.

The CCAC and the NCARB signed the Inter-Recognition Agreement. However, each Canadian provincial architectural association and each U.S. Member Board was required to ratify the agreement, forward a Letter of Undertaking, and append specific local requirements, where necessary.

Mutual Recognition Agreements

A mutual recognition agreement is an agreement between two international licensing authorities whereby each authority agrees to recognize and accept the credentials of professionals from the other authority. Over the years there has been considerable work on the part of the Royal Architectural Institute of Canada and provincial and territorial associations of architects in negotiating mutual recognition agreements with other international architectural organizations. To date there is an agreement between architectural licensing authorities from Mexico, United States and Canada. Discussions continue with the Architects Council of Europe (ACE) and the Asia-Pacific Economic Cooperation (APEC) Architect Project.

Continuing Education / Professional Development

All provincial and territorial licensing authorities have adopted mandatory Continuing Education programs and all architects must participate in order to maintain their licence or registration. *[Note: "Continuing education" is also called "professional development" and the Union internationale des architectes (UIA) uses the term "continuing professional development" or CPD]*. Continuing education assists in fulfilling the primary mandate of the associations in the protection of the public by ensuring architects remain competent and current in new technologies and new design developments. Furthermore, these programs enable architects to develop new markets and to improve their practices.

Each provincial and territorial association has slightly different continuing education requirements and each association has its own system for recording continuing education credits or transcripts; however, the RAIC has developed a national system and electronic database which several associations have adopted. Also, the RAIC has facilitated the standardization and harmonization of the various provincial continuing education programs across Canada. This work resulted in the production of document entitled, *Quality Assurance for Continuing Education Activities for the Architecture Profession in Canada* which has been adopted by all associations.

Learning activities, as described in the Quality Assurance document, are divided into two categories: Core Learning Activities and Self-Directed Learning Activities.

Definitions

Accreditation: The process that establishes that an educational program meets an established standard of achievement. Its purpose is to assure the maintenance and enhancement of an appropriate educational foundation. The process is generally done by regular, external monitoring using validated criteria and procedures.

Certification: The official or legal recognition of an individual's qualifications.

Core Learning Activities: are "educational opportunities that provide a fundamental level of knowledge relevant to the practice of Architecture throughout Canada".

Self-Directed Learning Activities: are "educational opportunities that have been selected by an individual". These activities must relate to the practice of architecture or business and must be relevant to the architect's specific situation.

References

Canadian Architectural Certification Board (CACB). Ottawa, Ont.

A Canadian Education Standard for Admission to Provincial Architecture Associations in Canada. January 1992 (revised June 1993).

1998 Conditions and Procedures for Accreditation. July 1998.

1998 Guide to Student Performance Criteria for Faculty and Students of Professional Degree Programme in Architecture. July 1998.

Canadian Architectural Students Association (CASA). *Guide to Canadian Graduate Schools of Architecture*. First Edition 2006
www.casa-acea.org

Committee of Canadian Architectural Councils (CCAC). *IAP Manual*. Ottawa, Ont.: CCAC, Second Edition 2001.

Examination for Architects in Canada
www.cexac.ca

National Council of Architectural Registration Boards (NCARB). *Architect Registration Examination*. Washington, D.C.: NCARB,
www.ncarb.org/are/index.html

Quality Assurance for Continuing Education Activities for the Architecture Profession in Canada
www.raic.org/continuing_education/quality-assurance_e.pdf

Royal Architectural Institute of Canada (RAIC) Syllabus.
www.raic-syllabus.ca

Valence, Jean R., *Architect's Essentials of Professional Development*. American Institute of Architects. Hoboken, New Jersey: John Wiley & Sons, Inc., 2003.

List: Canadian University Schools of Architecture with Accredited Programs

University of British Columbia
School of Architecture and Landscape Architecture
University of British Columbia
402-6333 Memorial Road
Vancouver, BC
V6T 1Z2

Website: *www.sala.ubc.ca*

University of Calgary
Faculty of Environmental Design
Professional Faculties Building, Room 2182
University of Calgary
2500 University Drive NW
Calgary, Alberta
T2N 1N4

Email: evdsinfo@ucalgary.ca
Website: *www.ucalgary.ca/evds*

University of Manitoba
Architecture, City Planning,
Interior Design and Landscape Architecture
201 Russell Building
University of Manitoba
Winnipeg, Manitoba
R3T 2N2

Email: visevicr@cc.umanitoba.ca
Website: *www.umanitoba.ca/faculties/architecture/37.htm*

Carleton University
School of Architecture
202 Architecture Building
1125 Colonel By Drive
Ottawa, Ontario
K1S 5B6

Email: architecture@carleton.ca
Website: *www.arch.carleton.ca*

Université de Montréal
École d'architecture
Université de Montréal
C.P. 6128, succ. Centre-ville
Montréal (Québec)
H3C 3J7

Email: archi@ame.umontreal.ca
Website: *www.arc.umontreal.ca*

Université Laval
Faculté d'aménagement, d'architecture et des arts visuels
École d'architecture
Édifice du Vieux-Séminaire de Québec
1, côte de la Fabrique - bureau 3210
Université Laval
Québec (Québec)
G1R 3V6

Email: arc@arc.ulaval.ca
Website: *www.arc.ulaval.ca*

McGill University
School of Architecture
Macdonald-Harrington Building
815 Sherbrooke Street West
Montréal (Québec)
H3A 2K6

Email: profdegree.architecture@mcgill.ca
Website: *www.mcgill.ca/architecture*

Dalhousie University
Faculty of Architecture and Planning
P.O. Box 1000
Halifax, Nova Scotia
B3J 2X4

Email: arch.office@dal.ca
Website: *http://architectureandplanning.dal.ca/index.shtml*

University of Toronto
Faculty of Architecture, Landscape and Design
230 College Street
Toronto, Ontario
M5T 1R2

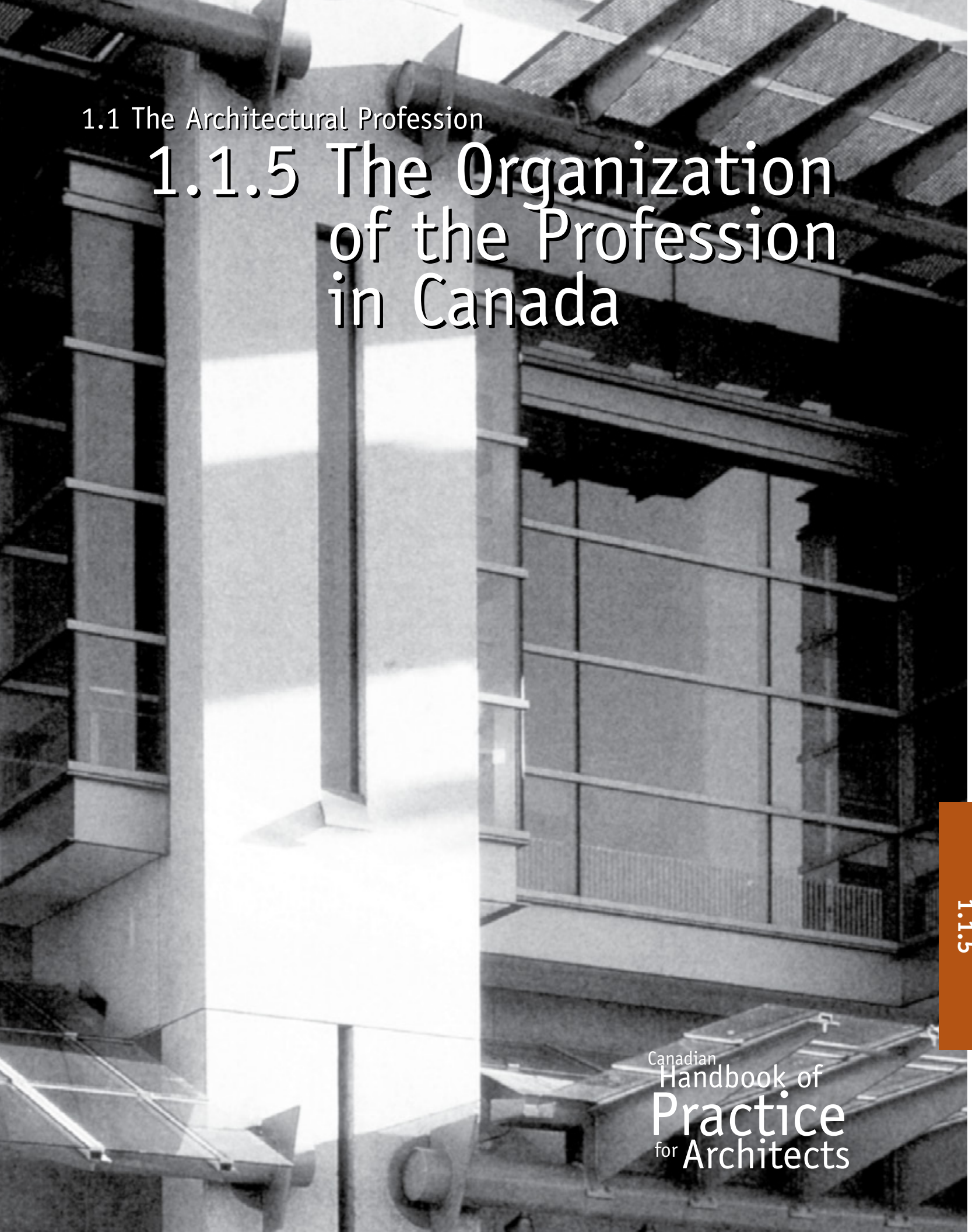
Email: enquiry.ald@utoronto.ca
Website: *www.ald.utoronto.ca/index_main.htm*

University of Waterloo
School of Architecture
7 Melville Street South
Cambridge, Ontario
N1S 2H4

Email : info@architecture.uwaterloo.ca
Website: *www.architecture.uwaterloo.ca*

Ryerson University (as of December 31, 2008 pending accreditation by CACB)
Architectural Science
350 Victoria Street
Toronto, Ontario
M5B 2K3

Email: archsci@acs.ryerson.ca
Website: *www.ryerson.ca/arch*



1.1.5 The Organization of the Profession in Canada

Historical Overview

The Royal Architectural Institute of Canada (RAIC)
- The RAIC College of Fellows
- The RAIC Foundation

Other National Organizations
- The Canadian Architectural Certification Board (CACB)
- The Canadian Council of University Schools of Architecture (CCUSA)

Self-Regulation

Provincial and Territorial Associations of Architects

Reference

List: Provincial and Territorial Associations of Architects

Vital Statistics: Provincial and Territorial Associations of Architects

List and Vital Statistics: National Architectural Organizations

Charts: Comparison of Practice Requirements of Each Provincial and Territorial Association

The Organization of the Profession in Canada

Historical Overview

Canada's architecture profession began to be organized in the 19th century, following trends similar to those in Europe. The Industrial Revolution in the early part of the century, together with technological and societal changes, led to the emergence of architectural societies which responded to the need for:

- regulation of the profession;
- promotion, support, and professional fellowship.

Regulation was required to safeguard public health and safety. Support and promotion were deemed necessary to foster a high standard of professional competence and to influence colleagues and the public.

The first architectural society in Europe was the Society of British Architects, formed in 1834, which became the Royal Institute of British Architects in 1837. Canada followed suit 50 years later with the Architectural Guild of Toronto, established in 1887. The next step was the founding of the Ontario Association of Architects, in 1889 and its incorporation in 1890. In Québec, the Province of Québec Association of Architects was created in 1890, later to become the Ordre des architectes du Québec.

By the turn of the century, demand arose for closer professional ties between provincial groups of architects in Canada. This led to the formation in 1907 of a national organization, the Institute of Architects of Canada. The organization was incorporated under the name "The Architectural Institute of Canada" by act of the Dominion Parliament on June 16, 1908. The new Institute formed an alliance with its British counterpart, the Royal Institute of British Architects. In 1909, after receiving permission to adopt the prefix "Royal," the Canadian organization became known as the Royal Architectural Institute of Canada (RAIC).

Over the next 80 years, architectural associations developed in all other provincial jurisdictions of the country.

The Royal Architectural Institute of Canada (RAIC)

After operating as a federation of provincial licensing organizations, the RAIC became a voluntary national professional organization in 1980. Its current vision and mission are as follows:

Vision:

To build awareness and appreciation of the contribution of architecture to the physical well-being and cultural development of Canada.

Mission:

The Royal Architectural Institute of Canada is the leading voice of architecture in Canada.

The RAIC's mission is:

- To affirm that architecture matters;
- To celebrate the richness and diversity of architecture in Canada; and
- To support architects in achieving excellence.

The role of the RAIC is to:

- act as a national forum;
- To provide practice support and leading-edge professional development for architects

- disseminate leading work in the field of architecture and architectural practice;
- encourage critique and debate;
- recognize excellence;
- facilitate communication among the professional associations and link the profession at the local level to a national and international network for information-sharing and advancement of professional issues.

The RAIC fulfils this role by running programs which span the full spectrum of design, technology transfer, and practice:

- *Publications:* the RAIC publishes technical and practice-oriented publications, newsletters, and directories including electronic publications;
- *Practice Support*: develops and maintains standard forms of contract for architectural services and updates and publishes the *Canadian Handbook of Practice for Architects*;
- *Symposia:* the RAIC organizes national roundtables and regional events;
- *Lobbying:* the RAIC lobbies the federal government and other client groups to protect the professional interests of all architects in Canada;
- *International Relationships:* the RAIC develops relationships with U.S. and Mexican architectural associations to enable members to take fuller advantage of NAFTA; the RAIC is the Canadian member section within the International Union of Architects or Union internationale des architectes (UIA); and, the RAIC shares information with other international architectural associations and facilitates discussion on mutual recognition with various multi-lateral organizations;
- *Festival of Architecture:* the RAIC organizes the annual Festival of Architecture which provides professional development courses and a forum for architectural issues and promotes public awareness of architecture;
- *Member services*: the RAIC provides discounts on professional publications and tools, professional tours, and a website for posting jobs and résumés;
- *Awards:* the RAIC recognizes excellence within the profession through the Governor General's Medals in Architecture, the RAIC Gold Medal, the Allied Arts Medal, and the RAIC Awards of Excellence and other awards;
- *Career Development:* the RAIC encourages the next generation of architects through the RAIC Student Medals, the RAIC Honour Roll, and the RAIC Syllabus Program.

The RAIC College of Fellows

The mission of the RAIC College of Fellows, founded in 1941, is to strengthen and reinforce efforts of the Institute in its endeavour to enhance and develop the profession of architecture.

The College of Fellows formally recognizes members and distinguished laypersons who have made outstanding contributions to the profession. Fellowship in the RAIC is an honour conferred on members singled out for their contribution to research, scholarship, public service or professional standing to the good of architecture in Canada, or elsewhere. The Investiture of Fellows, or the induction ceremony, is normally held at a convocation of the College during the RAIC's festival or conference.

The College also oversees the Institute's Honours and Awards Program.

The RAIC Foundation

The RAIC Foundation was established in 1964 as a charitable organization to receive tax-exempt financial contributions from RAIC members and the public at large. The foundation, which is a responsibility of the RAIC College of Fellows, has the following objectives:

- to promote and increase the knowledge, skill, and proficiency of the profession;
- to provide grants for research by Canadians or to undertake research in Canada in the field of architecture and in allied arts and sciences;
- to provide scholarships, bursaries, and fellowships to Canadian architects and Canadian architectural students.

Other National Organizations

The Canadian Architectural Certification Board (CACB)

Refer also to Chapter 1.1.4, *Admission to the Profession*, for a description of the composition and role of the Canadian Architectural Certification Board (CACB).

In 1976, recognizing the need for common professional standards, the registration or licensing authorities of nine provincial associations established the CACB. Its purpose was to assess and certify the academic qualifications of individuals who hold a professional degree or diploma in architecture and intend to apply for registration/licence. The Ordre des architectes du Québec joined the CACB in 1991.

The CACB now provides the following services:

- *certification* of the academic qualifications of candidates for admission to the profession;
- *accreditation* of the programs offered by the Canadian university schools of architecture.

The CACB is a not-for-profit corporation, whose members include the provincial and territorial licensing authorities, maintains an office in Ottawa.

The Canadian Council of University Schools of Architecture (CCUSA)

The Canadian Council of University Schools of Architecture (CCUSA) is a coordinating committee of the Canadian schools of architecture. It is comprised of the heads (or designates) from each of the eleven universities offering professional degrees in architecture. The CCUSA meets semi-annually to coordinate academic matters of national interest and offer a platform for collaboration and coordination among the eleven schools.

The Council Chair sits as a representative to the RAIC Board of Directors. The CCUSA also selects one of its members or former members to be Canadian Director on the Board of the Association of Collegiate Schools of Architecture. A founding partner of the Canadian Architectural Certification Board, the CCUSA makes an annual financial contribution to the CACB's operating budget and directly appoints three of its members.

Self-Regulation

Under the provision of the *Constitution Act*, the licensing and regulation of architects is carried out under provincial mandate. Architects, like other professionals (such as doctors, lawyers, accountants, engineers), are self-governing and self-regulating. The provincial and territorial legislatures or parliaments have enacted legislation or "Architects Acts" which establish associations of architects, enabling these associations to admit members. This privilege is granted in exchange for safeguarding the public.

By contrast, in some other countries, licensing is controlled by government bodies rather than by self-regulating organizations. For example, in the United States, state government agencies license and regulate professionals.

Provincial and Territorial Associations of Architects

The provincial and territorial associations of architects have been established by provincial or territorial statute.

Refer to the chart at the end of this chapter for a list of these associations. On the reverse side is a chart showing the respective enabling legislation for each association.

In this Handbook, "provincial association" is also used to refer to the Ordre des architectes du Québec (OAQ). This name and acronym have not been translated into English.

The provincial and territorial associations are governed by councils which may make regulations and/or bylaws, subject to the Lieutenant-Governor-in-Council, concerning the following matters:

- admission standards, including education, practical experience, and examination (refer to Chapter 1.1.4, *Admission to the Profession*);
- codes of conduct and ethics;
- professional standards of practice and performance;
- discipline of members for professional misconduct;
- licensing requirements, including temporary licences, Certificates of Practice;

- authority to administer a program of liability protection for the public;
- the operation of the governing council and the election of the council;
- committees and their operation;
- other matters related to the advancement of the profession and the practice of architecture.

Although the provincial and territorial licensing authorities (architectural associations) may be involved in other activities, including advocacy and promotion of the profession, their primary purpose remains the licensing of architects to ensure their competency and ability to provide proper professional services to the public.

In Québec, "The Professional Code" establishes the "Office des professions du Québec" which oversees and regulates all of the professional orders of Québec (professional associations), including the "Ordre des architectes du Québec" (OAQ).

There is a trend in Canada to separate the role of advocacy from regulation of the profession. The role of advocacy and promotion of the profession is sometimes undertaken by organizations other than the licensing authority. For example, in Québec the Association of Architects in Private Practice of Québec (AAPPQ) is an organisation independent of the Ordre des architectes du Québec (OAQ) created to promote the profession. The AAPPQ develops a fee schedule for architectural services and forms of contract for use in Québec. In Alberta, the newly created RAIC Alberta Chapter focuses on advocacy within the province and in Newfoundland the provincial government is creating two corporate bodies: Newfoundland and Labrador Architectural Licensing Board and Newfoundland and Labrador Association of Architects (NLAA). The Licensing Board will regulate the practice of architecture, whereas the Association will act as an advocate for the profession.

Reference

Canada. Industry Canada. *Sector Competitiveness Frameworks — Architecture, Part 1 — Overview and Prospects*. Ottawa, Ont.: Industry Canada, 1998.

List: Provincial and Territorial Associations of Architects

Architectural Institute of British Columbia
100-440 Cambie Street
Vancouver, BC V6B 2N5
Tel: (604) 683-8588
Fax: (604) 683-8568
E-mail: aibc@aibc.ca
www.aibc.bc.ca

Alberta Association of Architects
Duggan House Building
10515 Saskatchewan Drive
Edmonton, AB T6E 4S1
Tel: (403) 432-0224
Fax: (403) 439-1431
E-mail: info@aaa.ab.ca
www.aaa.ab.ca

Saskatchewan Association of Architects
642 Broadway Avenue, Suite 200
Saskatoon, SK S7N 1A9
Tel: (306) 242-0733
Fax: (306) 664-2598
E-mail: saa@link.ca
www.saa.sk.ca

Manitoba Association of Architects
137 Bannatyne Avenue, 2nd Floor
Winnipeg, MB R3B 0R3
Tel: (204) 925-4620
Fax: (204) 925-4624
E-mail: info@mbarchitects.org
www.mbarchitects.org

Ontario Association of Architects
111 Moatfield Drive
Toronto, ON M3B 3L6
Tel: (416) 449-6898
Fax: (416) 449-5756
E-mail: oaamail@oaa.on.ca
www.oaa.on.ca

Ordre des architectes du Québec
1825 boul. René Lévesque O.
Montréal, QC H3H 1R4
Tel: (514) 937-6168
Fax: (514) 933-0242
E-mail: info@oaq.com
www.oaq.com

Architects' Association of New Brunswick / Association des architectes du Nouveau-Brunswick
36 Maple Avenue
Sussex, NB E4E 2N5
Tel: (506) 433-5811
Fax: (506) 432-1122
E-mail: inquiries@aanb.org
www.aanb.org

Nova Scotia Association of Architects
1359 Barrington Street
Halifax, NS B3J 1Y9
Tel: (902) 423-7607
Fax: (902) 425-7024
E-mail: info@nsaa.ns.ca
www.nsaa.ns.ca

Architects Association of Prince Edward Island
P.O. Box 1766
Charlottetown, PE C1A 7N4
Tel: (902) 368-4999
www.aapei.com

Newfoundland and Labrador Association of Architects
P.O. Box 5204
St. John's, NF A1C 5V5
Tel: (709) 726-8550
Fax: (709) 726-1549
E-mail: nlaa@nf.sympatico.ca
www.newfoundlandarchitects.com

Northwest Territories Association of Architects
P.O. Box 1394
Yellowknife, NT X1A 2P1
Tel: (867) 766-4216
Fax: (867) 873-3654
E-mail: nwtaa@yk.com
www.nwtaa.ca

Vital Statistics: Provincial and Territorial Associations of Architects

Architectural Institute of British Columbia (AIBC)
Established: *1920*
Enabling Legislation: *Architects Act of British Columbia, RSBC 1997*
Number of Members: *1,199 resident, 318 non-resident*
Composition of Council: *10 members, 1 director from UBC School of Architecture or designate, 4 government appointees, 1 intern, 1 building designer, 1 interior designer and 1 architectural technologist*

Alberta Association of Architects (AAA)
Established: *1906*
Enabling Legislation: *Architects Act, RSA 1985*
Number of Members: *500 resident, 325 non-resident*
Composition of Council: *10 registered members, 1 government appointee, 1 licensed interior designer, 1 university appointee*

Saskatchewan Association of Architects (SAA)
Established: *1911*
Enabling Legislation: *The Architects Act, RSS 1996*
Number of Members: *82 resident, 119 non-resident*
Composition of Council: *8 registered members, 2 government appointees*

Manitoba Association of Architects (MAA)
Established: *1914*
Enabling Legislation: *The Architect's Act, RSM 1987*
Number of Members: 150 resident, 120 non-resident
Composition of Council: *8 registered members, 1 university and 2 government appointees and 2 interns*

Ontario Association of Architects (OAA)
Established: *1889*
Enabling Legislation: *Architects Act, RSO 1990*
Number of Members: *2,225 resident and 355 non-resident*
Composition of Council: *15 members including government appointees*

Ordre des architectes du Québec (OAQ)
Established: *1890*
Enabling Legislation: *Architects Act, RSQ 1994*
Number of Members: *2,587 resident, 202 non-resident*
Composition of Council: *13 members, 3 government appointees*

Association des architectes en pratique privé au Quebec (AAPPQ)
Established: *1977*
Number of Firms: *360*
Composition of Executive Committee: *5 members*

Architects' Association of New Brunswick (AANB)
Established: *1933*
Enabling Legislation: *An Act Respecting the Architects' Association of New Brunswick, RSNB 1987*
Number of Members: *75 resident, 106 non-resident*
Composition of Council: *7 registered members*

Nova Scotia Association of Architects (NSAA)
Established: *1932*
Enabling Legislation: *The Architects Act, RSNS 2006*
Number of Members: *153 resident, 50 non-resident*
Composition of Council: *7 licenced architects 1 university appointee*

Architects Association of Prince Edward Island (AAPEI)
Established: *1988*
Enabling Legislation: *Architects Act, RSPEI 1990*
Number of Members: *15 resident, 49 non-resident*
Composition of Council: *5 registered members*

Newfoundland and Labrador Architectural Licencing Board (NLALB)
Established: *2009*
Enabling Legislation: *Architects Act*
Number of Licence Holders: *34 resident and 26 non-resident*
Composition of Board: *5 elected NLAA members plus 2 appointed lay persons.*

Newfoundland and Labrador Association of Architects (NLAA)
Established: *1949*
Enabling Legislation: *Architects Act*
Number of Members: *Licence holders automatically become members of the NLAA*
Composition of Council: *5 members*

Northwest Territories Association of Architects (NWTAA)
Established: *2001*
Enabling Legislation: *Architects Act, SNWT 2001, c.10*
Number of Members: *20 resident, 16 non-resident*
Composition of Council: *6 registered architects and 1 public member appointed by the government*

Notes:
1. Membership numbers are for the year 2008. This information provides a comparison of the size of each association.
2. The number of members refers to registered or licensed architects, not the total number of members.

List and Vital Statistics: National Architectural Organizations

Canadian Architectural Certification Board (CACB)
1 Nicholas Street, Suite 710
Ottawa, Ontario K1N 7B7
Tel.: (613) 241-8399
Fax: (613) 241-7991
Email: info@cacb.ca
www.cacb-ccca.ca

Established: 1977

Composition of the Board:
The CACB Board has up to eleven members and consists of:

- Up to three (3) registered architects representing the licensing authorities. These individuals are appointed by the Canadian Architectural Licensing Authorities (CALA)
- Up to three (3) architectural educators appointed by the Canadian Council of University Schools of Architecture (CCUSA).
- Up to three (3) registered architects representing the practice and teaching of architecture appointed jointly by CCUSA and CALA.
- Up to two (2) students representing the Canadian Architecture Students Association (CASA) or its successor.

The board elects a president annually.

Royal Architectural Institute of Canada (RAIC)
55 Murray Street, Suite 330
Ottawa, Ontario K1N 5M3
Tel: (613) 241-3600
Fax: (613) 241-5750
www.raic.org

Established: *1907*
Number of Members: *3,800 members in 2008*

Composition of Board:
12 representatives:

- the president;
- The first vice-president and president elect;
- 7 regional directors;
- the chancellor of the College of Fellows;
- the chair of the CCUSA;
- the past-president.

The president is elected annually from the board of directors by the board.

Charts: Comparison of Practice Requirements of Each Provincial or Territorial Association

The following comparisons contain excerpts from provincial and territorial Architects Acts. Please refer to the full text for a complete understanding of the legislation.

5A: Comparison of Provincial Requirements regarding the RIGHT or AUTHORITY to Practise Architecture
5B: Comparison of Provincial Requirements regarding PROFESSIONAL LIABILITY INSURANCE
5C: Comparison of Provincial Requirements regarding PARTNERSHIPS
5D: Comparison of Provincial Requirements regarding the OWNERSHIP and STRUCTURE OF CORPORATIONS which Practise Architecture
5E: Comparison of Provincial Requirements for the NAME of an Architectural Practice
5F: Comparison of Provincial Requirements/Guidelines regarding the APPLICATION of SEALS

Chart 5A: Comparison of Provincial or Territorial Requirements regarding the RIGHT or AUTHORITY to Practise Architecture

The following comparisons contain excerpts from provincial architects acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirement to Practise Architecture
AIBC	registration and *Certificate of Practice;* registration of practices
AAA	registration and *Annual Certificate*
SAA	registration and *Licence to Practice Architecture*
MAA	registration of firm for all architectural partnerships, groups of members, or sole proprietors; and *Certificate of Approval* for architectural corporations and joint A/E firms and corporations [Note: Certificate of Authorization from the Professional Engineers of Manitoba is also required for joint A/E firms and corporations]
OAA	licence and Certificate of Practice [Note: Certificate of Authorization is required from the Professional Engineers of Ontario if practice is providing engineering services]
OAQ	registration
AANB	registration and *Certificate of Practice*
NSAA	registration: Corporate Permit (for Partnerships and Corporations)
AAPEI	registration and *Certificate of Practice*
NLALB	registration, and for partnerships or corporations only, a *Certificate of Approval*
NWTAA	registration, and *Certificate to Practice*; registration of firm and *Permit to Practice*

Chart 5B: Comparison of Provincial or Territorial Requirements regarding PROFESSIONAL LIABILITY INSURANCE

The following comparisons contain excerpts from provincial or territorial Architects Acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirement for Professional Liability Insurance
AIBC	• *recommends* coverage of $250,000 per claim and $500,000 annual aggregate • Certificate of Practice holder must notify client in writing whether or not professional liability insurance is held and under what terms (Bulletin 66)
AAA	• no current requirement
SAA	• no current requirement
MAA	• corporations and joint A/E firms and corporations must have minimum coverage of $250,000 • Act permits establishment of a Professional Liability Claims Fund (none established to date)
OAA	• mandatory Professional Liability Insurance for all Certificates of Practice through ProDemnity Insurance Company if office is in Ontario; otherwise, proof of PL coverage to same limits • minimum coverage $250,000 per claim
OAQ	• all architects having their own practice must contribute to the professional liability insurance fund of the OAQ (Fonds d'assurance de la responsabilité professionnelle) • minimum coverage $1,000,000 per claim (annual aggregate $2,000,000)
AANB	• Mandatory professional liability insurance coverage for all Certificate of Practice holders. Minimum coverage - $250,000 per claim ($500,000 aggregate)
NSAA	• Mandatory professional liability insurance coverage of at least $250,000 per claim, with aggregate coverage of at least $500,000.
AAPEI	• no current requirement
NLALB	• all resident and non-resident Certificates of Approval require professional liability insurance
NWTAA	• no current requirement

Chart 5C: Comparison of Provincial or Territorial Requirements regarding PARTNERSHIPS

The following comparisons contain excerpts from provincial and territorial architects acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirement for Partnerships
AIBC	65. (1) A member, architectural firm or licensee must not practise architecture in partnership with a person not entitled to practise architecture, or make an agreement or arrangement or do an act that will enable the person to practise architecture contrary to this Act. (2) A person registered or licensed under this Act may enter into a partnership with a professional engineer registered under the laws of British Columbia for the practice of the person's profession. *(Architects Act)*
AAA	33(1) A registered architect may practise architecture as a partner in a partnership only if the partnership meets all of the following requirements: (a) one or more registered architects or architects corporations hold (i) more than 50% of the interest in the partnership, or (ii) not less than 50% of the interest in the partnership, if the remainder of the interest in the partnership is held by licensed interior designers or professional engineers, or both; (b) the partners in the partnership who are not authorized entities (i) do not engage in the practice of architecture; (ii) are of good character, and (iii) are satisfactory to the Council. 33(3) Subject to section 3 of the Act and notwithstanding subsection (1), a registered architect may enter into a partnership with one or more engineers or engineers firms, as those terms are defined in Section 17 of the Act.
SAA	13.01 Where a firm other than a corporation is constituted for the practice of architecture the majority of the principals of the firm must be members of the Association. *(Bylaws)* "firm" means a person or body that carries on the practice of architecture and includes an architect, a partnership and a licensed corporation (Bylaws – 1.01.5); "partnership" means an association of authorized entities or authorized entities and other persons that carry on the practice of architecture, whether on a full-time, part-time or limited basis (Bylaws – 1.01.6).
MAA	15(1) No person or firm is entitled to practise as an architect in Manitoba, or to take or use in Manitoba the designation "architect" or "architects", either alone or in combination with any other words or any name, title, or description, implying that he or they is or are an architect or architects unless the person or each member of the firm is a member of the association in good standing and registered as such. *(Architects Act)* 16(1) Despite subsections 15(1) and 25(2) a corporation or firm that does not meet the requirements of subsection 15(1) or 15(2) may practise architecture in its own name, and may use the designation "architect", "architects" or other words implying that it is practising architecture, if (a) the corporation or firm holds a valid certificate of approval; (b) the professional liability insurance or alternative coverage of its practice of architecture meets the requirements prescribed by the council; and (c) its practice of architecture is carried on by or under the direct personal supervision of one or more registered architects who have professional responsibility for the practice and are shareholders, members or permanent employees of the corporation or firm. *(Architects Act)*

Provincial Association	Requirement for Partnerships
MAA	13.6 (2) An application for a Certificate of Approval allowing a Joint Architectural and Engineering Firm to practice architecture shall be made to Council, in the form approved by Council. The application shall be accompanied by the following: (a) evidence, satisfactory to Council, that the practice of architecture will be carried on by or under the direct personal supervision, and will be the responsibility of, one or more permanent employees or partners who are Registered Members; (b) evidence, satisfactory to Council, that all of the partners of the Firm are: (i) Professional Engineers; or (ii) Professional Engineers and Registered Members; (c) evidence, satisfactory to Council, that the primary and customary business of the Firm will be both the practice of architecture and the practice of professional engineering; (d) evidence, satisfactory to Council, that the Joint Architectural and Engineering Firm has professional liability insurance in such minimum amounts and containing such terms and conditions as may be prescribed from time to time by Council; (e) evidence, satisfactory to Council, that the Joint Architectural and Engineering Firm holds a Certificate of Authorization from the Association of Professional Engineers and Geoscientists of the Province of Manitoba. *(By-Laws)*
OAA	15(1) The Registrar shall issue a certificate of practice to a partnership of members of the Association that applies thereof in accordance with the regulations and that proposes to engage in or hold itself out as engaging in the practice of architecture. (2) The Registrar shall issue a certificate of practice to a partnership of members of the Association of Professional Engineers of Ontario that applies thereof in accordance with the regulations and that, (a) holds a certificate of authorization; and (b) employs at least one member of the Association who will personally supervise and direct the practice of architecture by the partnership. (3) The Registrar shall issue a certificate of practice to a partnership of one or more members of the Ontario Association of Architects and one or more members of the Association of Professional Engineers of Ontario that holds a general certificate of authorization and that applies in accordance with the regulations and that proposes to engage in or hold itself out as engaging in the practice of architecture. *(Architects Act)*
OAQ	A "partnership of architects" is the only recognized partnership in Québec
AANB	13(3) Members or licensees may practice architecture in a name other than their own and conduct their business as a partnership with members, licensees, engineers or other individuals, or with corporations meeting the requirements of paragraphs 13(4) (a) and (c) if (a) at least two thirds of the partners who are individuals are architects or engineers and at least one of whom is an architect; (b) one of the principal and customary functions of the partnership is the practice of architecture; (c) the practice of architecture is carried out under the responsibility and supervision of an architect who is a partner, an employee of the partnership or an officer, director or employee of a corporate partner; and (d) the partnership holds a valid Certificate of Practice. *(Architects Act)*
NSAA	22(1) A person must not enter into partnership to practise architecture with any person who is not a licensed architect, unless the other person is a person authorized to practise or to apply engineering under the Engineering Profession Act, or a person referred to in subsection (2). (2) A person who is not a licensed architect but who, on February 1, 1968, was a member of a partnership engaged in the practice of architecture and duly registered under the Partnerships and Business Names Registration Act may continue to be a partner in that partnership until the dissolution of the partnership, or may enter into partnership with any of the licensed architects with whom they may become associated, but the person is not entitled to practise architecture unless that person holds a licence or is acting under the responsible control of a licensed architect.

Provincial Association	Requirement for Partnerships
AAPEI	(3) Members or licensees may practise architecture in a name other than their own and conduct business as a partnership with other members, licensees or other individuals, or with corporations meeting the requirements of clauses (4) (a) and (c) if (a) at least one of the individual partners is an architect having an interest in the partnership of not less than that of any other individual or corporate partner; (b) one of the principal and customary functions of the partnership is the practice of architecture; (c) the practice of architecture is carried out under the responsibility and supervision of an architect who is a partner, or an officer or director of a corporate partner; and (d) the partnership holds a valid certificate of practice. *(Architects Act)*
NLALB	24 (1) The Council shall issue a Certificate of Approval to a resident partnership or firm where Council is satisfied in writing that (a) one of the principal and customary functions of the partnership or firm is to practise architecture; (b) the practise of architecture is the responsibility of, and is carried out under the supervision of, a partner in the partnership, or a principal of the firm who is registered or licensed to practise architecture in the province; and (c) two-thirds of the partners of the partnership or two-thirds of the principals of the firm are qualified to practise in the design professions. Note: *"Design profession"* includes the professional practice of architecture or engineering, landscape architecture, town planning, environment planning, interior design and related professions but does not include the practice of drafting. *(Architects Act)*
NWTAA	"firm" includes a partnership, corporation or association of persons.

Chart 5D: Comparison of Provincial or Territorial Requirements regarding the OWNERSHIP and STRUCTURE OF CORPORATIONS which Practise Architecture

The following comparisons contain excerpts from provincial architects acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	REQUIREMENTS FOR CORPORATIONS which practise architecture
AIBC	• incorporated under the *Company Act* and in good standing, • **majority** of each class of voting shares is legally and beneficially owned by architects, • **majority of directors** are architects, • **CEO is an architect,** • all persons practising on behalf of corporation are under direct supervision of an architect who is a continuing employee or shareholder, • corporations of engineers and architects also permitted (similar rules apply), • transfer of voting rights to non-architects not permitted if majority control would be altered, • Certificate of Practice required *(Architects Act)*
AAA	• the Articles of Incorporation must be approved by Council and must contain 5 required clauses (see Section 10 of the General Regulation); • the name of the corporation must meet the established requirements (see section 27 of the General Regulation) • the corporation must have one or more full-time permanent employees or shareholders who are registered architects who will assume direct personal supervision, direction and control of the practice of architecture in which the corporation proposes to engage; • the beneficial ownership of more than 50% of the corporations voting shares must be vested in one or more registered architects, one or more architect-held corporations, or a combination of registered architects and architect-held corporations; • if the beneficial ownership includes interior designer and/or engineers then 50% of the voting shares must be held by one or more registered architects; • a majority of the directors and officers of the corporation must be registered architects • any shareholders of the corporation who are not registered architects, licensed interior designers or professional engineers must be of good character and satisfactory to the Council; *(Architects Act General Regulation Section 10-12)*
SAA	A corporation shall only be granted a license to practice architecture and shall only retain such license where: .1 one of its principal and customary functions is to practice architecture and the practice is to be conducted under the supervision of a member or members of the Association who is or are employed by the corporation and who individually assume the function of and are responsible as members for architectural services performed, notwithstanding their employment with the corporation; .2 the personal seal or stamp of a member or members of the Association and not the seal of the corporation must be used to stamp any required drawings; .3 the name of the corporation shall not be worded in such a manner that it might mislead the public; .4 the provisions of all incorporating documents (whether Memorandum of Association, Articles of Association, Letters Patent or Articles of Incorporation) and bylaws of the corporation and any alterations or amendments thereto are filed with and approved by council; .5 one of the directors must be a member of the Association; .6 the control of the corporation shall be vested in members of the Association and, without limiting the generality of the foregoing, at least 51% of the voting shares of the corporation shall be beneficially and absolutely held by members of the Association; and .7 a member shall not enter into any agreement transferring voting rights in the member's shares in the corporation to a person who is not a member. *(Bylaw - 12.01)* The corporation shall file with council any and all proposed alterations or amendments to its incorporating documents or bylaws or to its corporate structure, including any unanimous shareholder agreement pertaining thereto, and shall obtain the approval of council thereto before effecting any such change. (12.02) The corporation shall at all times be maintained in good standing with the Director of Corporations and shall, once every year, file with the council a certified copy of the annual return required to be filed with the Director of Corporations. (12.03)

Provincial Association	REQUIREMENTS FOR CORPORATIONS which practise architecture
SAA	Notwithstanding anything herein above contained, the council may reject or revoke any application for a license to practice architecture or a renewal thereof where the corporation has failed to comply with or has subsequently violated any provisions of this bylaw or if the corporation has been guilty of conduct which, in the sole judgment of the council, is inimical to the best interest of the public or the profession of architecture in Saskatchewan. (12.04) Where a corporation is but a partner in a firm, whether with other corporationsor with individuals, the provisions of this bylaw shall apply to such corporation. (12.05) A corporation shall have its license to practice architecture suspended or revoked where any member of the Association who is a director or shareholder of the corporation has been suspended from membership in the Association or whose membership has been revoked under sections 28, 29, 30 or 31 of the Act; provided that council may, at its discretion, continue or reinstate the license of the corporation upon such terms and conditions as the council sees fit. (12.06)
MAA	• practice is under direct supervision and control of a permanent employee or shareholder who is a registered member, • **majority** of voting shares are owned by registered members of the MAA and/or APEGM, • **majority of directors** are registered members of the MAA and/or APEGM, • **at least one officer** is a registered member, • primary and customary business is the practice of architecture or the practice of engineering and architecture, • liability insurance in minimum amounts and under terms and conditions as prescribed by Council, • corporation has a Certificate of Practice from the association (and joint A/E corporation must also hold a Certificate of Authorization from APEGM), • Certificate of Approval required/Corporation or Joint A/E Corporation stamp issued. *(Architects Act and By-Laws)*
OAA	• **majority of directors** are members of OAA or members of Professional Engineers of Ontario • **majority of each class of shares** owned by members of OAA or PEO, • non-architects owning shares must be full-time employees, • primary function is to engage in practice of architecture, • one director or full-time employee must be a member who will personally supervise and direct the practice of architecture, • **no person** (**non-architect** or non-engineer) may **own**, directly or indirectly, or exercise control or direction, or beneficially own, directly or indirectly, shares of any class together with another shareholder or other shareholders exercise control over **more than 49%** of any class of shares; • joint shares between member and non-member are deemed to be owned by a non-member, • "associated with another shareholder" means: • one shareholder is a corporation of which the other shareholder is an officer or director, • one shareholder is a partnership of which the other shareholder is a partner, • one shareholder is a corporation controlled directly or indirectly by the other shareholder, • both shareholders are corporations controlled by the same individual that controls the other shareholder, • both shareholders are members of a voting trust relating to the shares of a corporation, • control means 50% of shares are held for the benefit of one person or corporation. *(Architects Act 14 & 21)*
OAQ	In Québec, the Ordre des architectes du Québec (OAQ) is in the process of changing its regulations to permit architects to incorporate. As of 2009, a company cannot practice architecture; only individuals, partnerships or consortia can practise architecture.
AANB	• one of the principal functions of the corporation or of each corporate partner is the practice of architecture, • the practice of architecture is carried out under the responsibility and supervision of a director, officer or employee who is an architect, • at least **two-thirds of the directors** of the corporation or of each corporate partner are architects or engineers and at least one of whom, for each corporation, is an architect, and the **majority of** the issued **shares** of each class of voting shares are beneficially owned by and registered in the name of the architects and engineers, • Certificate of Practice required. *(Architects Act)*

Provincial Association	REQUIREMENTS FOR CORPORATIONS which practise architecture
NSAA	23. The majority of the issued voting shares of the corporate entity, representing voting control of the corporate entity, are beneficially owned by 1 or more licensed architects; • a majority of the directors and officers of the corporate entity are licensed architects; • any person who practises architecture on behalf of the corporate entity is a licensed architect; Corporate Permit required (2) Issued voting shares of a corporate entity may be legally and beneficially owned by another corporate entity, if (a) all of the issued voting shares of the other corporate entity are legally and beneficially owned by one or more licensed architects, or a by a trust of which each of the trustees and beneficiaries is a licensed architect; and (b) the majority of the officers and directors are licensed architects.
AAPEI	• one of the principal and customary functions of the corporation or each corporate partner is the practice of architecture, • practice of architecture carried out under the responsibility and supervision of a director, officer or employee who is an architect, • **at least one director** and **each corporate partner** is an architect and is the beneficial and registered owner of **no fewer** of each class of voting shares **than the number of such shares held by any other shareholder** or director, • Certificate of Practice required. NON-RESIDENT Corporations • **two-thirds** of the partners, principals or **directors** must be architects, • **majority** of issued **shares** of each class of voting shares beneficially owned and registered in the name of architects. *(Architects Act)*
NLALB	• one of principal and customary functions is the practice of architecture,, • practice of architecture carried out under the supervision of a **director** who is **registered** in the province, • **two-thirds** or more of **directors** qualified to practise in **a design profession**, if corporation has three or more directors, if less than three directors at least **one** must be an **architect**, • not less than **51%** of shares beneficially owned and registered in the name of directors in the design professions as above, or 100% of shares are beneficially owned by architects registered in the province. NON-RESIDENT Corporations • each director who is an architect must be registered in the province. *(Architects Act)*
NWTAA	"firm" includes a partnership, corporation or association of persons. 29. (1) Subject to subsection (2), the council shall approve the issuance of a permit to a firm that (a) applies in accordance with the bylaws; (b) pays the application fees required by the bylaws; and (c) has at least one director, partner or officer of the firm who (i) is an architect, restricted practitioner, or licensee, (ii) will serve as the professional representative of the firm, and (iii) will directly supervise the practice of architecture by, and the professional conduct of, the firm. (2) The council may not approve the issuance of a permit to a firm that is a corporation unless (a) it is incorporated, continued or registered under the Business Corporations Act and has filed with the Registrar of Corporations all documents required to be filed under that Act; (b) at least one of the directors of the corporation complies with the requirements in paragraph (1)(c); and (c) a function of the corporation is to engage in the practice of architecture. Extra-Territorial Corporation (3) The council shall approve the issuance of a permit to a firm incorporated or formed under the laws of another jurisdiction if the firm (a) is licensed or authorized to practice architecture by that jurisdiction; and (b) complies with the requirements in paragraphs (1)(a) to (c). *(Architects Act)*

Chart 5E: Comparison of Provincial or Territorial Requirements regarding the NAME of an Architectural Practice

The following comparisons contain excerpts from provincial or territorial Architects Acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirements/Restrictions for the NAME of an Architectural Practice
AIBC	No architectural firm shall use a name which is misleading or unprofessional and all architectural firm names shall be subject to approval by Council. *(Bylaw 15.1)*
AAA	• a firm name must contain the word "architect", "architects", "architectural", or "architecture" but cannot use the plural unless more than one registered architect works with the firm as a partner or shareholder; • the name cannot be self-laudatory or misleading; • if the names of one or more individuals are included in the name of the firm then the names may only be of architects, licensed interior designers, or engineers who are partners or shareholders. At least one of the names must be the name of a registered architect who is a partner or shareholder in the firm; • the name or a retired or deceased registered architect may be used in the name of a firm upon the conditions set out in Section 27(4) of the General Regulation; • all names require the approval of Council *Architects Act General Regulation Section 27.* *See also Sections 29-31 regarding Letterhead and Business Card requirements*
SAA	The name of the ***corporation*** shall not be worded in such a manner that might mislead the public (Bylaw – 12.01.3); The name of the ***firm*** shall not be worded in such a manner that it might mislead the public (Bylaw - 13.02). The name of an architectural firm ***must include the word "architect" or an acceptable derivative*** (architects, architecture, architectural) as is appropriate (Practice Bulletin).
MAA	15.4 a) No Sole Proprietorship, Architectural Firm, Architectural Corporation or Partnership of Architectural Corporations shall carry on, in any way, business under a name or style that: 15.5 i) is the same or similar to a name being used by a Registered Member, Firm or Corporation Sole Proprietorship, Architectural Firm, Architectural Corporation or Partnership of Architectural Corporations that engages in the practice of architecture so that its use would, in the opinion of Council, be likely to deceive or confuse the public; ii) is otherwise misleading; iii) is scandalous, obscene or immoral; or iv) indicates a superior level of practice, a special level of expertise, or compares abilities, either expressly or by implication with other Sole Proprietorships, Architectural Firms, Architectural Corporations or Partnerships of Architectural Corporations. b) The name or style under which a Sole Proprietorship, Architectural Firm, Architectural Corporation or Partnership of Architectural Corporations carries on the practice of architecture shall include the word "architect" or an abbreviation, derivation or variation thereof approved by Council. c) The letterhead used by a Sole Proprietorship, Architectural Firm, Architectural Corporation or Partnership of Architectural Corporations must indicate, either in the Firm or Corporation name, or elsewhere on the letterhead, the names of all Registered Members, and if applicable the names of all Corporations, who are: i) partners in the Firm, and/or ii) Directors of the Corporation. d) The name and a copy of the letterhead to be used by a Sole Proprietorship, Architectural Firm, Architectural Corporation or Partnership of Architectural Corporations in the practice of architecture shall be submitted to Council for approval prior to the Sole Proprietorship, Architectural Firm, Architectural Corporation or Partnership of Architectural Corporations being entitled to practice architecture. 15.6 a) No Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation shall carry on, in any way, business under a name or style that: i) is the same of is similar to a name being used by a Sole Proprietorship, Architectural Firm, Architectural Corporation, Partnership of Architectural Corporations, Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation, that engages in the practice of architecture or the practice of architecture and the practice of professional engineering, as the case may be, so that its use would, in the opinion of Council, be likely to deceive or confuse the public; ii) is otherwise misleading; iii) is scandalous, obscene or immoral; or iv) indicates a superior level of practice, a special level of expertise, or compares abilities, either expressly or by implication, with any Sole Proprietorships, Architectural Firms, Architectural Corporations, Partnerships of Architectural Corporations, Joint Architectural and Engineering Firms or Joint Architectural and Engineering Corporations b) The name of style under which a Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation carries on the practice of architecture may include the word "architect" or an abbreviation, c) The letterhead used by a Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation must indicate, either in the Firm or Corporation name, or elsewhere on the letterhead, the name of: i) all Professional Engineers, and if applicable all Registered Members, who are partners in the Firm or Directors of the Corporation; and ii) the Registered Members who will be professionally responsible for the practice of architecture by the Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation. *(Bylaws)*

Provincial Association	Requirements/Restrictions for the NAME of an Architectural Practice
OAA	No holder of a certificate of practice, a certificate of practice issued under section 23 of the Act or a temporary licence shall use a name designation or letterhead that is, a) the same as or similar to the name of a sole proprietorship, partnership, corporation or joint venture that engages in the practice of architecture in Ontario so that its use would be likely to deceive; b) a number name. c) in the case of a corporation that does not have a number name, a name other than the name of the corporation; d) otherwise misleading; e) scandalous, obscene or immoral; or f) self-laudatory.
OAQ	5.03.02 The name of a partnership of architects shall include the names of the members of the Order who practise together. 5.03.03 When an architect withdraws from a partnership, his name must be removed from the partnership name except in the cases provided for in section 5.03.04. 5.03.04 When an architect withdraws from a partnership to practise alone, to join another partnership or to perform duties that are incompatible with the practice of his profession, his name must be removed from the partnership name within 6 months from his withdrawal, unless there is an agreement to the contrary. 5.03.05 Notwithstanding section 5.03.02, a partnership of architects may retain in its name the name of a deceased or retired architect for 1 year following the death or retirement, provided that the architect was a member of the partnership at the time of his death or retirement. 5.03.06 Notwithstanding section 5.03.05, the name of a partnership of architects may include the name of a deceased or retired architect provided that the architect was a member of that partnership during the 5 years preceding his death or retirement and provided that the architect, his heirs or his successors have concluded an agreement to that effect. Such agreement may be revoked for cause. *(Regulations)*
AANB	6.5.1 A holder of a Certificate of Practice shall not use a name, designation or letterhead that is a) the same as or similar to the name, designation or letterhead of a sole proprietorship, partnership, corporation or joint venture that engages in the practice of architecture in New Brunswick so that the use would be likely to deceive or confuse; b) a number name of a corporation; c) a name other than the name of the corporation; d) misleading; e) scandalous, obscene or immoral; or f) self-laudatory. 6.5.2 Styling of firm, company or corporate names and the composition of letterheads of persons applying for a Certificate of Practice shall be approved by Council. 6.5.3 Names and designations for firms or corporate names shall comply with the following: a) anonymous designations are in general acceptable. A name or designation may include the name, names or initials of a past or present member. The name, names or initials of past or present members of the Association of Professional Engineers of New Brunswick may be included; b) Firm names or designations shall not include the name or initials of individuals other than as authorized in subsection 6.5.3 (a); and c) Firm names or designations may use the word "Architect", or any addition, abbreviation, derivation or variation thereof, and also the term "partner(s)", "associate(s)", "and associate(s)" or "partnership" if associates or partners in fact exist. The term "associate" or "partner" in this context means another member of the design professions. d) The design professions in this context shall include persons duly qualified in the fields of landscape architecture, community planning and interior design, but does not include technicians or technologists. Any dispute as to the meaning or eligibility shall be referred to Council, whose decision shall be final. *(Bylaws)*
NSAA	No regulation regarding selection of name.
AAPEI	14 (2)Members or licensees may practise architecture in a name other than their own and conduct their business as a proprietorship if… (3)Members or licensees may practise architecture in a name other than their own and conduct their business as a partnership with other members, licensees or other individuals, or with corporations meeting the requirements of clauses (4)(a) and (c) if… . (4)A corporation may practise architecture in its own name or in partnership with a member, licensee or other corporation if… *(Architects Act)*
NLALB	C.1 (a) Styling of Firm or company names and composition of letterhead shall not be such as to be misleading to the general public, and shall comply with the following requirements: 1) Any proper names appearing in the Firm Title shall be those of the constituent members of the firm. Professional designation of each constituent member must also be included in the composition of the letterhead. 2) Anonymous designations may be used for Firm or Company names in strict compliance with the Architect's Act, provided that the principals of the Firm or Company and their designation are listed on the Firm or Company letterhead. 3) No designation shall be used which refers to the plural term (Architects, Engineers, etc.) or Associates, Partners, etc., when such do not exist. 4) The Firm name or letterhead shall not incorporate any words which would imply that offices are maintained in any other City, Province or Country when such is in fact not the case. 5) Firm titles or letterheads shall not incorporate any wording which would mislead potential clients. *(Code of Professional Conduct)*
NWTAA	no regulation regarding the name of an architectural practice

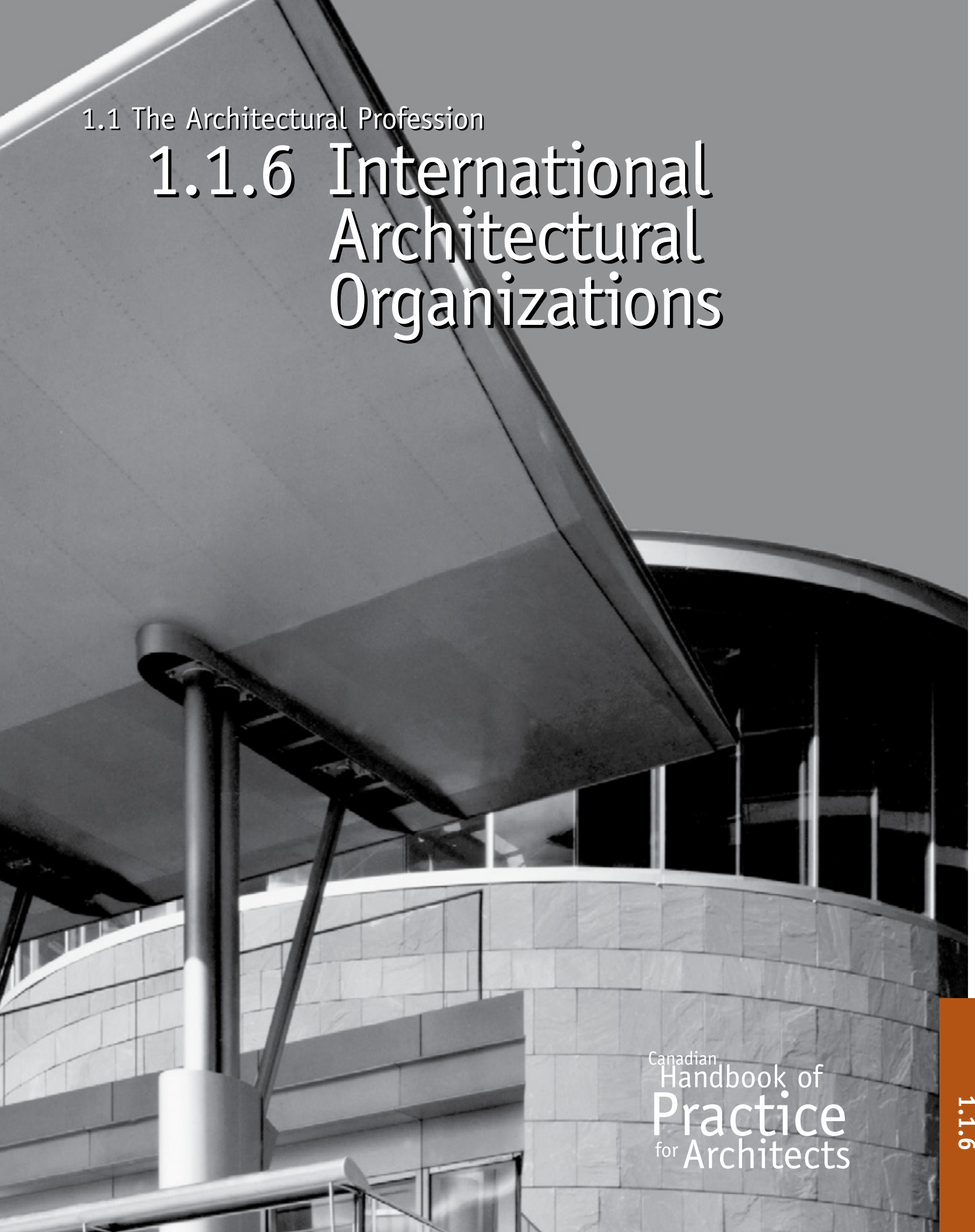
Chart 5F: Comparison of Provincial or Territorial Requirements/ Guidelines regarding the APPLICATION of SEALS

The following comparisons contain excerpts from provincial or territorial Architects Acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirements or Guidelines re: SEALS
AIBC	77 (1) An architect must apply a seal, with signature and date, to letters of assurance, certificates, drawings and specifications prepared by or under the architect's supervision, direction or control if the architect practises architecture… 78 A member of the institute or a licensee must not affix his or her seal to a plan, working drawing, detail drawing, specification or other document unless it was prepared under the supervision, direction or control of the member or licensee. *(Architects Act)*
AAA	2 (2) No person except a registered architect, visiting project architect, architects corporation or architects and engineers firm shall … (c) affix a seal or a stamp of a registered architect or the stamp of a visiting project architect, architects corporation or architects and engineers firm, or permit that seal or stamp to be fixed, to a plan, drawing, detail drawing, specification, or other document or a reproduction of any of them unless (i) that plan, drawing, detail drawing, specification or other document or reproduction was prepared by or under the personal supervision, direction and control of, and (ii) the seal or stamp is affixed with the knowledge, consent and in accordance with the direction of the registered architect or visiting project architect to whom or the architects corporation or architects and engineers firm to which the seal or stamp was issued by the Registrar. *(Architects Act)*
SAA	2.02 Every member shall have a seal, supplied by the Association, the impression of which shall contain the name of the member, the member's registration number and place of business, and the words "Registered Architect, Saskatchewan" and the name of the Association. .1 The seal when affixed to drawings, shall bear the member's signature and the date. .2 The seal is the property of the Association. If a person ceases to be a member of the Association, their seal shall be promptly delivered to the office of the Association. If the member is reinstated, the seal shall be returned to the member. .3 The practice of electronic sealing is recognized, and regulations in this bylaw shall apply to it accordingly, modified as needed to accommodate the changed format. *(Bylaws)*
MAA	11.4 (b) All working drawings, specifications and the certificates involved in the practice of architecture when issued shall bear the seal and signature of the Registered Member responsible for the design as well as the date on which the seal and signature were affixed. (c) Whenever a Registered Member uses his/her seal, his/her signature shall appear across the seal. In the case where there is more than one name on the seal, at least one of the Registered Members named there-on shall sign the seal. 11.5 (b) All working drawings, specifications and certificates involved in the practice of architecture which are prepared by, through or on behalf of an Architectural Corporation, Partnership of Architectural Corporations, Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation, shall bear the seal and signature of the Registered Member responsible for the design and the stamp of the Architectural Corporation or Partnership of Corporations, Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation, as well as the date on which the stamp, seal and signature were affixed. (c) Whenever a an Architectural Corporation, Partnership of Architectural Corporations, Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation uses its stamp, the signature of the Registered Member responsible for the design shall appear across the stamp of the Architectural Corporation, Partnership of Corporations, Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation. *(Bylaws)* • Seals are required on working drawings, specifications, and certificates. • Also, seals are required on reports prepared by Corporations.
OAA	The seal and signature must be applied to "every design prepared under his or her personal supervision and direction and issued or exhibited to a person who is not a holder and is submitted as part of an application for a building permit or is used for the construction, enlargement or alteration of a building, except in the case of an open competition in which anonymity is a requirement" *(Regulation 27, 42(21))**

Provincial Association	Requirements or Guidelines re: SEALS
OAQ	An architect must identify by means of his signature and seal all plans, preliminary or working specifications, work supervision reports, payment certificates, change orders, work completion certificates and experts' reports, prepared for architectural work by himself or under his immediate control and supervision. *(Regulation respecting the Code of Ethics 3.04.01)*
AANB	15(3) Unless exempted by by-law, every member or licensee practising architecture in New Brunswick in his own name shall sign, date and affix his stamp to all designs, specifications, reports, contracts and other documents pertaining to the practice of architecture which have been prepared by the member or licensee, or under the direct supervision of the member or licensee. 15(5) Every person authorized to practice architecture under this Act who fails to sign and affix their stamp to a final construction document, as required by this section, is guilty of professional misconduct. *(Architects Act)*
NSAA	32 Every licensed architect must have a seal of a design authorized by the regulations, and shall bear the name of the licensed architect and the words "licensed architect, Nova Scotia Association of Architects". 33 All technical submissions prepared by a licensed architect, or under the architect's responsible control, shall be sealed with the seal of the licensed architect and signed by the licensed architect, signifying that the licensed architect was in responsible control of the content of the technical submissions and has applied the required standard of care. 34 No licensed architect may sign or seal technical submissions unless prepared by or under the responsible control of the architect, except that (a) the architect may sign or seal those portions of the technical submissions that were prepared by or under the responsible control of persons who are licensed under this Act if the architect has reviewed and adopted in whole or in part such portions and has either co-ordinated their preparation or integrated them into the architect's work; and (b) the architect may sign or seal those portions of the technical submissions that are not required by this Act to be prepared by or under the responsible control of an architect if the architect has reviewed and adopted in whole or in part such submissions and integrated them into the architect's own work. 35 Any licensed architect signing or sealing technical submissions not prepared by that architect, but prepared under that architect's responsible control by persons not regularly employed in the office where the architect is resident, shall maintain and make available to the Board upon request for at least five years following such signing and sealing, adequate and complete records demonstrating the nature and extent of the architect's control over and detailed knowledge of such technical submissions throughout their preparation.
AAPEI	16. (3) Every member or licensee practising architecture in Prince Edward Island in his own name shall sign and affix his stamp to all final designs or construction documents which have been prepared by such person or under the supervision of such person. (4) Every proprietorship, partnership or corporation practising architecture in Prince Edward Island shall affix its stamp to all designs which have been prepared by the proprietorship, partnership or corporation, and have such designs signed by a member or licensee designated on the certificate of practice. (5) Every person authorized to practice architecture under this Act who fails to sign and affix their stamp to a final design or construction document, as required by this section, is guilty of professional misconduct. *(Architects Act)*
NLALB	33.2 (2) All final drawings, specifications, plans, reports and other documents involving the practice of architecture, when issued, shall bear the signature and seal of the architect who prepared or approved them. *(Architects Act)*
NWTAA	89.(c) The stamp shall be affixed to a document only when the professional taking responsibility is satisfied that the work has been completed to an acceptable standard. The responsible professional shall sign across the imprint of the stamp and indicate the date of the signature. 89.(g) The permit stamp shall be affixed to a document only after the professional or professionals taking responsibility have affixed their personal stamps. The officer or employee, so authorized by the Permit Holder, shall affix the stamp, sign across the imprint of the stamp and indicate the date of the signature. *(By-Laws)*

** OAA Bulletin A.1 describes the appropriate use of the Architect's professional seal including the electronic application of the seal.*



1.1.6 International Architectural Organizations

Introduction

International Organizations
- International Union of Architects (UIA)
- Architects Council of Europe (ACE)
- APEC Architect Project
- Federation of Pan-american Architects' Association or Federacion panamericana de asociaciones de arquitectos (FPAA)

North American Organizations
- The American Institute of Architects (AIA)
- National Council of Architectural Registration Boards (NCARB)
- National Architectural Accrediting Board, Inc. (NAAB)
- Association of Collegiate Schools of Architecture (ACSA)
- Federación de Colegios de Arquitectos de le República Méxicana (FCARM)
- Asociación de Instituciones de Enseñanza de la Arquitectura de la República Mexicana (ASINEA)

Reference

Chart: Comparison of Licensing Procedures for Architects in Canada, the United States, and Mexico

List: International Organizations

International Architectural Organizations

Introduction

Most nations have some form of professional or legal organization for their architects. This Handbook cannot outline them all, but will briefly describe one international body, three multilateral organizations that have relations with the architectural profession in Canada, and those organizations within North America which affect the Canadian architectural community. In the past, Canadian architects were closely affiliated with Britain and the Commonwealth, and many were members of the Royal Institute of British Architects (RIBA). Today, however, most architects in Canada have closer ties with their colleagues in North America and often provide services worldwide.

International Organizations

International Union of Architects (UIA)
www.uia-architectes.org

The International Union of Architects, or Union internationale des architectes (UIA), was founded in 1948 in Lausanne, Switzerland, as a federation of professional societies from several countries. From the 27 delegations present at the founding assembly, the UIA has grown to encompass the key professional organisations of architects in 116 countries and territories, and now represents, through these organisations, more than 1,300,000 architects worldwide. The Royal Architectural Institute of Canada is the member section for Canada within the UIA.

The UIA's mission is to represent the global community of architects and to promote the profession within the following organizations:

- the UIA Member Sections;
- other non-governmental organizations (in order to develop interdisciplinary contacts):
  - ICOMOS (International Council on Monuments and Sites);
  - ICSID (International Council of Societies of Industrial Design);
  - ICOGRADA (International Council of Graphic Design Associations);
  - IFI (International Federation of Interior Designers);
  - ISOCARP (International Society of City and Region Planners);
  - INTA (International Development Association);
- intergovernmental institutions (in which the UIA is the only officially recognized association for architecture):
  - UNESCO (United Nations Educational, Scientific and Cultural Organization);
  - UNCHS (United Nations Centre for Human Settlements);
  - ECOSOC (United Nations Economic and Social Council);
  - UNIDO (United Nations Industrial Development Organization);
  - WHO (World Health Organization).

The UIA has also established the Professional Practice Commission, which has developed a basic framework regarding international standards of professionalism for architects. Adopted at the 1999 UIA Congress in Beijing, this framework assists nations and professional architectural associations in developing national standards and reaching mutual recognition agreements for the practice of architecture.

Architects Council of Europe (ACE)

www.ace-cae.org

The Architects' Council of Europe (ACE), as the only representative organization at the European level, aspires to speak with a single voice on behalf of the architectural profession.

It is based in Brussels and its Members are the regulatory and professional representative bodies of all European Union (EU) Member States, Accession States, Switzerland and Norway. Through them, ACE represents the interests of over 450,000 architects in Europe.

The principal function of the ACE is to monitor relevant policy and legislative developments at the EU level, seeking to influence those areas of EU Policy that have an impact on architectural practice, and on policies affecting the overall quality and sustainability of the built environment.

APEC Architect Project

www.apecarchitects.org

The Asia-Pacific Economic Cooperation (APEC) operates as a cooperative, multilateral economic and trade forum. The APEC Architect Project was endorsed by the Human Resources Development Working Group of the APEC in 2000 following a proposal by the Australian government to facilitate the mutual recognition of skills and qualifications of architects in the provision of professional services between member economies. The project is self-funded by the respective architectural organizations. A Secretariat rotating amongst the 14 member economies provides the necessary support to APEC Architect Project members and maintains a website.

The purpose of the APEC Architect Project is to establish a common basis for the recognition of professional competence that will simplify access to independent practice as an architect in other participating economies.

The Royal Architectural Institute of Canada is the member for Canada and hosts a register of architects interested in providing services within member economies of the APEC Architect Project.

Federation of Panamerican Architects' Associations or Federacion panamericana de asociaciones de arquitectos (FPAA)

www.fpaa-arquitectos.org

The Federation of Panamerican Architects Associations is an organization that brings together the associations of architects within the Americas (North, South, Central America and the Caribbean) and it represents Region III of the UIA (the Americas). FPAA is supported by a Secretariat in Uruguay and the working language of FPAA is primarily Spanish.

Although the RAIC has been a member of FPAA in the past, it is currently not a member.

North American Organizations

The American Institute of Architects (AIA)

The American Institute of Architects (AIA) was founded in New York City in 1857. The AIA is a representative body rather than a governing or controlling body. It divides the United States into regions, each of which is represented by a member on the Board of Directors. The regions have chapters; the number of chapters per region depends on the population density. The chapters' bylaws are set by the national body.

The AIA has more than 83,500 licensed architects (in 2008) and is a voluntary professional association dedicated to organizing and uniting the profession. The AIA requires its members to commit to a code of ethics and professional conduct, as well as to professional development through its program of continuing education.

Members of the RAIC may become associate AIA members. Refer to Chapter 1.1.5, *The Organization of the Profession in Canada*, for information on the RAIC.

National Council of Architectural Registration Boards (NCARB)

The National Council of Architectural Registration Boards (NCARB) is a not-for-profit corporation. All the legally constituted architectural registration boards of the 50 U.S. states and four territories are members. The NCARB assists its 54 Member Boards through the following activities:

- preparing and delivering a uniform examination — the Architect Registration Examination (ARE);
- establishing standards in education and training;
- verifying qualifications of applicants and certifying architects;
- developing standards for professional conduct;
- administering the Intern Development Program.

The provincial and territorial associations of architects work closely with the NCARB, and, in 1994, an Inter-Recognition Agreement was signed between between the NCARB and the former Committee of Canadian Architectural Councils (CCAC). This agreement assists architects in Canada and the United States to obtain architectural licences in most jurisdictions in each other's country. In addition, Canadian provincial and territorial licensing authorities continue to use and recognize the ARE as an examination to assess the competency of intern architects.

National Architectural Accrediting Board, Inc. (NAAB)

Formed in 1940, the National Architectural Accrediting Board, Inc. (NAAB) is responsible for accrediting professional degree programs in schools of architecture in the United States. This is similar to the accreditation function of the Canadian Architectural Certification Board (CACB) which has adopted most of the NAAB's accreditation criteria. The NAAB has a board of directors comprised of appointees from the following organizations:

- AIA (The American Institute of Architects);
- NCARB (National Council of Architectural Registration Boards);
- ACSA (Association of Collegiate Schools of Architecture);
- AIAS (American Institute of Architecture Students).

Association of Collegiate Schools of Architecture (ACSA)

The Association of Collegiate Schools of Architecture is not-for-profit, membership association founded in 1912 to advance the quality of architectural education. The association is based in the United States.

The Association of Collegiate Schools of Architecture (ACSA) is similar to the Canadian Council of University Schools of Architecture (CCUSA). The Association is comprised of of over 250 schools of architecture in several membership categories including all ten accredited university schools of architecture in Canada. A forum for "ideas on the leading edge of architectural thought," the ASCA publishes the *Journal of Architectural Education (JAE)* and a newsletter *(ACSA News)*.

Federación de Colegios de Arquitectos de la República Méxicana (FCARM)

The Federación de Colegios de Arquitectos de la Republica Méxicana (FCARM), or the Federation of the Colleges of Architects of the Republic of Mexico, is a national professional organization, with headquarters in Mexico City. FCARM is comprised of 71 "Colegios" representing about 15,000 architects.

Most Mexican jurisdictions (states) have a professional association known as a "Colegio," and these associations have united to form the national federation. The Colegios, which are responsible for establishing codes of ethics, deal with issues of professional practice and public complaints.

FCARM's mission is to:

- coordinate the needs and interests of its members;
- encourage professional development;
- develop standards of practice;
- promote the profession to the public.

As a result of the North American Free Trade Agreement (NAFTA), the FCARM has signed a Tri-national Agreement with some provincial associations of architects and the US National Council of Architectural Registration Boards (NCARB). Ratification and implementation of this agreement is underway.

Asociación de Instituciones de Enseñanza de la Arquitectura de la República Mexicana (ASINEA)

The Asociación de Instituciones de Enseñanza de la Arquitectura de la República Mexicana (ASINEA) has a similar function to the Canadian Council of University Schools of Architecture (CCUSA) and the Association of Collegiate Schools of Architecture (ACSA). Comprised of 81 schools of architecture, ASINEA has a multifaceted objective: the exchange of pedagogic, administrative, social, and academic information. As part of its efforts to continually enhance the several Schools and Facultades (faculties) of architecture within the Mexican Republic, ASINEA also deals with architectural criteria for education standards and curriculum.

Reference

Col.legi d'Arquitectes de Catalunya. *Architectural Practice Around The World*. COAC, 2005. *www.coac.net/internacional/defaultang.html*

Chart: Comparison of Licensing Procedures for Architects in Canada, the United States, and Mexico

	Canada	U.S.A.	Mexico
Education	Professional degree accredited by CACB or individual certification Graduation (professional degree) National	Professional degree accredited by NAAB Graduation (professional degree) National	Professional degree "Professional examination" 480 hours of social service Cédula ARCHITECT1 National
Certification of Academic Qualifications	CACB	NCARB	SEP2
Experience	Intern Architect Program (IAP) 5,600 hours experience National	Intern Development Program (IDP) 5,600 hours experience National (not mandatory in all states)	
Examination	Examination for Architects in Canada (ExAC) or the Architect Registration Examination (ARE) National	Architect Registration Examination (ARE) National	
Certification of Professional Qualifications	Provincial or territorial associations	NCARB (optional)	
Licence	Responsibility of provincial or territorial association of architects	Responsibility of state government agency	
Practice	**Architect** Most provinces have additional requirements for "Practice" (such as Certificate of Practice, Professional Liability Insurance)	**Architect** No restrictions	**Architect and/or Director Responsable de OBRA** No restrictions (in certain jurisdictions only)

Notes:
- Information has been developed from site visits by U.S.A./Canada Team to Mexican architectural education institutions, as part of Tri-National Committee on Architecture and NAFTA. (March 1, 1997)
- Information regarding Mexico is to be confirmed by Mexico.
- This chart is a simplified graphic representation of general procedures for licensing.
- "National" means that a national standard exists.

Footnotes:
1. The scope of practice allowed at the initial "Cédula" is restricted with regard to building size and type.
2. SEP is "Secretaría de Educación Publica".

List: International Organizations

International

- The Architects' Council of Europe
  29, rue Paul Emile Janson
  B-1050 Brussels, BELGIUM
  Tel: 32 2 543 1140
  Fax: 32 2 543 1141
  www.ace-cae.org

- Commonwealth Association of Architects (CAA)
  P.O. Box 508
  Edgware HA8 9XZ
  UNITED KINGDOM
  Tel: 44 20 8951 0550
  www.comarchitect.org

- PanAmerican Federation of Architects Associations (FPAA)
  General Secretary: Gonzálo Ramírez 2028.
  Montevideo, URUGUAY CP 11200
  Tel: (598) (2) 419.34.63
  Fax: (598) (2) 411.95.56
  Email: *fpaasau@adinet.com.uy*

- Union internationale des architectes (UIA) / International Union of Architects
  Tour Maine Montparnasse – B.P. 158
  33 avenue du Maine
  75755 Paris, cedex 15
  FRANCE
  Tel: 33 (1) 45 24 36 88
  Fax: 33 (1) 45 24 02 78
  www.uia-architectes.org

Mexico

- Federación de Colegios de Arquitectos de la Republica Méxicana (FCARM)
  Yucatan 189-201, Tizapan, San Angel
  Del Alvaro Obregon
  Distrito Federal
  México, D.F.
  MEXICO 01090
  Tel: (52 55) 55 50 60 49
  Fax: (52 55) 55 40 41 80
  www.fcarm.org.mx

United States

- The American Institute of Architects (AIA)
  1735 New York Avenue, NW
  Washington, D.C. 20006-5292 U.S.A.
  Tel: (202) 626-7300
  www.aia.org

- National Council of Architectural Registration Boards (NCARB)
  1801 K Street NW, suite 700-K
  Washington, D.C. 20006 U.S.A.
  Tel: (202) 783-6500
  Fax: (202) 783-0290
  www.ncarb.org

- National Architectural Accrediting Board, Inc. (NAAB)
  1735 New York Avenue, NW
  Washington, D.C. 20006 U.S.A.
  Tel: (202) 783-2007
  Fax: (202) 783-2822
  www.naab.org

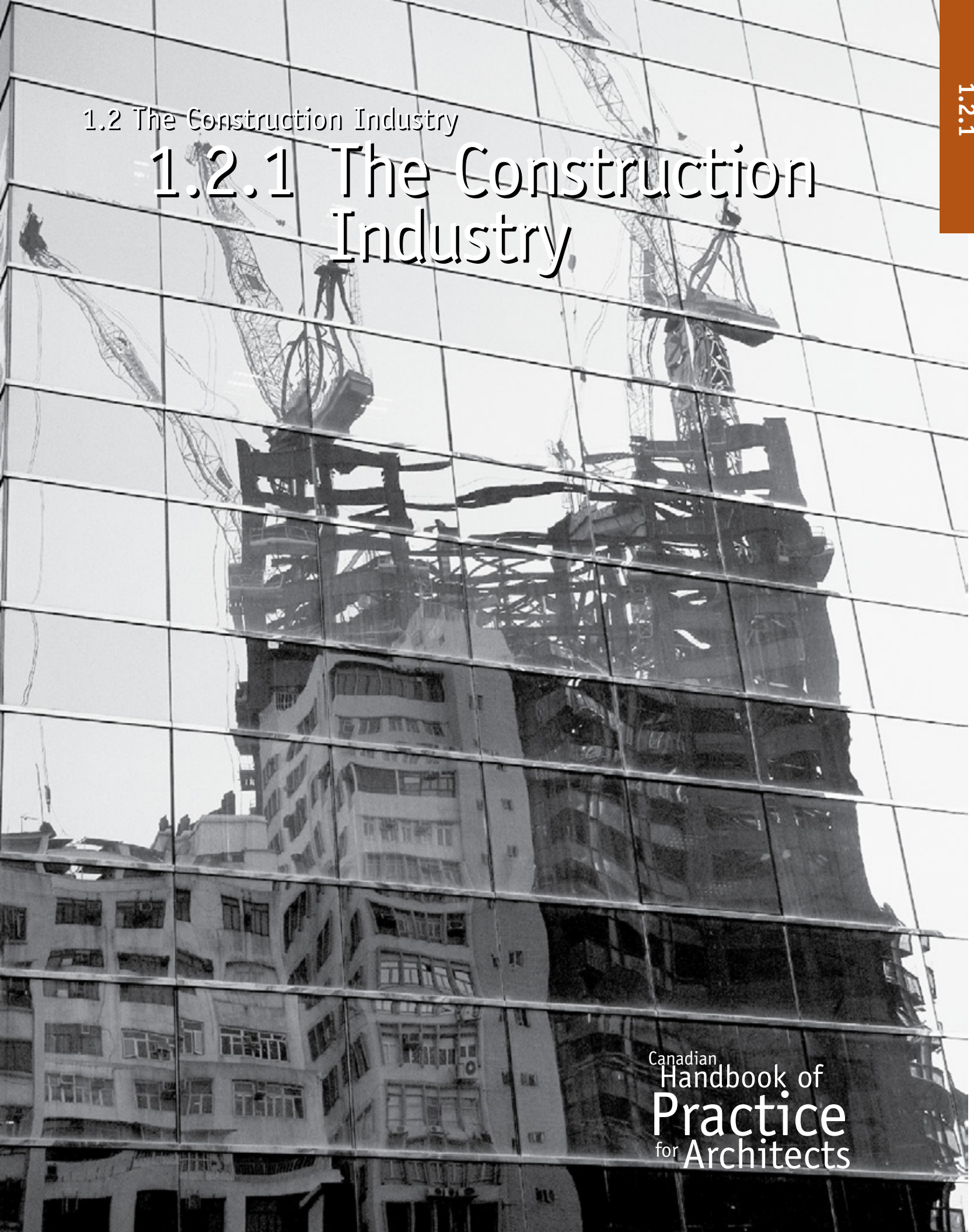
- Association of Collegiate Schools of Architecture (ACSA)
  1735 New York Avenue, NW
  Washington, D.C. 20006 U.S.A.
  Tel: (202) 785-2324
  Fax: (202) 628-0448
  www.acsa-arch.org

Others

- Royal Institute of British Architects (RIBA)
  66 Portland Place
  London W1N 4AD ENGLAND
  Tel: +44 207 580 5533.
  Fax: +44 207 255 1541.
  www.architecture.com

- Royal Australian Institute of Architects (RAIA):
  - National Office:
    Level 2, 7 National Circuit
    BARTON ACT 2600
    PO Box 3373
    MANUKA ACT 2603
    AUSTRALIA
    Tel: (02) 6121 2000
    Fax: (02) 6121 2001
    www.architecture.com.au

1.2.1 The Construction Industry



1.2.1

Overview

Participants of the Construction Industry
- Owners
- Designers
- Constructors
- Manufacturers and Suppliers
- Trades
- Bonding and Insurance Companies

Canada Green Building Council

Canadian Construction Association (CCA)

Provincial and Local Construction Associations

Construction Associations and Bid Depositories

Canadian Home Builders' Association (CHBA)

Construction Safety
- Workplace Safety Insurance Board or Workers Compensation Boards
- Construction Safety Associations

Construction Industry Consultative Committee (CICC)

Canadian Construction Documents Committee (CCDC)

Definitions

References

List: Canadian Construction Documents

The Construction Industry

Overview

According to the Canadian Construction Association, the non-residential sector employed close to 1.2 million people and produced $191 billion in goods and services in 2008. Add to this the value of residential construction, including multiple housing units, and it is clear that construction is the largest sector of the Canadian economy – this sector represents between 15% and 17% of Canada's gross domestic product.

The construction industry is divided into three major sub-sectors, each accounting for approximately one-third of the total construction industry. These sub-sectors:

- often respond to different market forces;
- often use different construction techniques and materials;
- often employ different labour forces.

All three sub-sectors are distinct, however in recent years there is more overlap between them:

- the **residential construction** sub-sector covers all dwellings from single-family homes to large apartment buildings;
- the **institutional, commercial, and industrial construction** sub-sector covers all buildings other than residential;
- the **engineering (or heavy civil) construction** sub-sector covers all non-building construction projects, including roads, sewer and water, bridges, dams, railways, ports, airports, pipelines, and oil and gas facilities.

The construction process is multifaceted and usually involves the following phases:

- studying the feasibility of the project;
- securing financing;
- developing the concept;
- developing the design;
- obtaining regulatory approval;
- building the project;
- commissioning the project;
- operating and maintaining the asset after project completion;
- demolishing and recycling the asset.

Participants in the Construction Industry

The building sub-sectors are composed of many loosely coordinated components, most of which fall into four major groups:

- **owners** — the public- and private-sector buyers of construction;
- **designers** — professionals such as architects and engineers, and others, including interior designers, planners, and various other consultants and technical personnel, responsible for the design documentation and overseeing of construction;
- **constructors** — contractors, sub-contractors, trade contractors, manufacturers, suppliers, and trades responsible for construction of buildings;
- **others** — lending institutions such as mortgage and finance companies, real estate services, trade associations, researchers, analysts, Authorities Having Jurisdiction, and other miscellaneous official and service agencies.

Owners

Building owners can be divided into two distinct groups:

- the public sector — responsible for projects ranging from simple school additions to major institutional and military installations;
- the private sector — ranges from homeowners requiring simple home renovations, through to corporations which build complex industrial and commercial buildings and multi-family residential buildings.

Governments at the federal, provincial, and municipal level contribute to — and influence — the construction industry in two ways:

- by enacting legislation regulating construction;
- by procuring, owning, leasing, managing, and maintaining their buildings.

Refer also to Chapter 1.2.2, *The Client*, for a more detailed discussion on owners.

Designers

Many kinds of designers are involved in the construction industry. However, because of the unique training that architects receive, they often act as prime consultant — or manager and coordinator — for most *building* design work meant for human occupancy greater than a certain area. Other buildings (such as industrial plants and warehouses), as well as other engineering construction (such as bridges), may involve an architect but not usually as the prime (or coordinating) consultant.

A host of specialist professionals and paraprofessionals assist architects in this role. Refer to Chapter 1.2.3, *Consultants*, for the roles of other consultants and designers in the construction industry.

Constructors

Construction is undertaken, for the most part, by:

- **general contractors** who assume overall responsibility for the construction of a project;
- **trade contractors** who perform specialized services.

Trade contractors usually operate as subcontractors to general contractors on new construction, but they often contract directly with owners for repair or renovation contracts, or when "Construction Management" is the selected method of construction procurement. To limit their financial exposure, construction firms operate with overheads that are low relative to the size of the projects that they undertake. Contractors traditionally use bank and supplier credit to finance their operations, and often lease equipment or finance it through chattel mortgages.

Contractors employ skilled labour and trades to build projects using custom-manufactured and/or standard products and components, supplied either directly from the manufacturer or through a system of individual suppliers and wholesalers.

Labour force and hiring practices in the construction industry are driven by market fluctuations. Most workers are hired on a project-by-project basis, often through union (and in some provinces, non-union) hiring halls. Often, only key personnel are employed on salary over the long term. Consequently, firms quickly expand and contract their operations (and enter and exit the industry) in a relatively flexible manner in response to changing business conditions.

Manufacturers and Suppliers

In many instances, materials and products selected for construction are manufactured to established requirements of codes and standards. Product standards used in the construction industry are established by various standards-writing bodies, composed of a combination of:

- users/owners;
- manufacturers;
- technical and trade specialists;
- building industry manufacturers and suppliers;
- Authorities Having Jurisdiction;
- building design professionals;
- testing agencies.

The architect selects materials and products meeting these requirements for incorporation into the work. Materials and products may be

"off the shelf " or custom manufactured for each project.

Refer also to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies,* and Trade Associations.

Manufacturers and suppliers can be excellent sources of technical assistance for the architect. Typically, manufacturers provide the architect with technical information and product samples to review and to include in the office library. Manufacturers and suppliers frequently participate in construction industry trade shows, such as IIDEX and Construct Canada, which:

- showcase new and existing products and building components;
- provide the latest technical information.

Trades

Trade or specialty sub-contractors employ skilled labour to:

- incorporate pre-manufactured and custom products and materials into the built work;
- undertake specialized construction procedures (such as scaffolding or core drilling).

These skilled tradespeople include carpenters, masons, plasterers, plumbers, steel workers, electricians, and many other classes of skilled workers.

Workers are trained on the job as journeymen or apprentices until they achieve the required level of competence. Community colleges/cégeps (collège(s) d'enseignement général et professionnel) and vocational schools, in consultation with trade unions and other standards-setting organizations, provide supplementary training. Certain skilled workers — such as plumbers, electricians, and elevator installers — must be licensed.

Refer also to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*.

Bonding and Insurance Companies

An important part of the construction industry are the different companies which:

- provide bonds, known as sureties, to contractors;
- underwrite and provide insurance to contractors and owners;
- provide professional liability insurance to design professionals.

For more information on construction insurance, refer to CCDC 21, *A Guide to Construction Insurance*.

For more information on bonds and sureties, refer to CCDC 22, *A Guide to Construction Surety Bonds*.

For information on the Canadian Construction Documents Committee or CCDC, refer to page 7 of this Chapter.

In most jurisdictions, architects and engineers are required to carry professional liability insurance. There are a few private insurance companies which provide this specialized insurance. Because of the high cost of premiums for architects due to the limited availability or competition in the marketplace for this type of insurance, and to ensure accessiblity to all members, some associations have established their own liability insurance funds.

The Ontario Association of Architects has established its own indemnity plan which provides the mandatory indemnification required by the Ontario *Architects Act*.

In Québec, by virtue of the Professional Code and the regulations of the OAQ, architects who practise on their own must contribute to the Professional Liability Insurance Fund of the OAQ.

Refer to "Charts: Comparison of Practice Requirements of each Provincial Association" in Chapter 1.1.5, *The Organization of the Profession in Canada,* for the professional liability insurance requirements for architects in each province.

Canada Green Building Council

The Canada Green Building Council was formed in December 2002. Orginally it was the Sustainable Buildings Canada Committee of the Royal Architectural Institute of Canada; however, after a couple of successful years the Committee very quickly had outgrown its original mandate, and included many members from the design and construction industry who were not architects, and it needed to expand. The RAIC assisted in the creation of the CAGBC, provided administrative support, and housed the CAGBC in its offices during its formative years.

The CAGBC now develops and administers a Canadian version of the popular LEED® (Leadership in Energy and Environmental Design) rating systems for buildings. It is affiliated with the US Green Building Council and holds the licence for LEED® in Canada.

Refer to Chapter 2.3.4, *Pre-design* - Appendix A - *Green Building Rating Systems*, for more information on LEED®.

Canadian Construction Association (CCA)

Founded in 1918, the Canadian Construction Association (CCA) is a national body with a membership of more than 20,000 individuals and companies. The CCA represents the interests of the construction industry throughout Canada. Seven active sections and eleven standing committees take responsibility for completing the CCA's ongoing tasks in the following areas:

- apprenticeship;
- contract and bidding practices;
- electronic dissemination of bid documents;
- employment equity;
- the environment and sustainable development;
- infrastructure promotion;
- interprovincial trade barriers;
- research and development;
- taxation issues affecting the construction industry and employment insurance reform.

The CCA is governed by an executive committee and a board of directors comprised of volunteer members. The members, who are selected from a variety of constituent groups with different construction-related interests, are elected at the annual general meeting.

Based in Ottawa, the CCA represents the industry's national interests when lobbying the federal government.

For further information, contact:

Canadian Construction Association
400-75 Albert Street
Ottawa, Ontario K1P 5E7
Tel: (613) 236-9455
Fax: (613) 236-9526
www.cca-acc.com

Provincial and Local Construction Associations

Most urban communities throughout Canada have construction associations.

Membership in these associations often includes a fully integrated affiliate membership in the Canadian Construction Association. In this case, members enjoy all the benefits and privileges of membership in the national association as well as those offered by the local associations. Local construction associations have the following aims and objectives:

- representation at local, provincial, and (through the CCA) federal levels of government;
- the provision of education and professional development to industry members;
- the operation of display services for plans and specifications for the convenience of owners, designers, and member firms;
- the provision of labour relations services;
- the provision of alternative dispute resolution services;
- the promotion of business relations between members of every sector of the construction industry in the community;
- resolution of industry-related concerns raised by members.

To achieve these aims and objectives, each association periodically elects a chairperson and board of directors selected from the membership at large. Equal representation is sought from the following industry sectors:

- general contractors;
- trade contractors;
- mechanical and electrical contractors;
- manufacturers, supply and service companies, and professionals.

Elected representatives from each construction association or local chapter within a province also form a provincial council. The council's tasks include lobbying the provincial government on issues such as:

- workers compensation;
- health and safety legislation;
- lien legislation;
- provincial tax matters;
- employment equity;
- other construction industry-related issues.

For more information on affiliated provincial, regional, and local construction associations, contact the provincial or local construction association.

Construction Associations and Bid Depositories

Most urban communities throughout Canada have a bid depository.

In many instances, bid depositories operate as an adjunct to the local construction association under the direction of a chair and board of directors, who are elected periodically from volunteer representatives of local user groups and professionals.

Construction associations and their bid depositories help to manage the bid process by:

- disseminating bid documentation, information, and addenda;
- promptly collecting trade contractor bids for multiple-trade projects.

These trade or sub-contractor bids are distributed to general contractors so that they may be included in the general contractor's bid for major construction projects.

Bidding through bid depositories follows a strict set of rules and guidelines. The purpose of these rules is to:

- minimize confusion;
- limit bid shopping;
- make all required information available to all members of each bid depository and to all general contractor bidders registered with that bid depository.

Bid depositories are usually organized at the provincial level. Boards or committees are elected or appointed to:

- prepare rules and procedures;
- provide dispute resolution services if a dispute arises out of the bidding process.

For more information on rules, procedures, and other services, contact the local bid depository.

Recently the Canadian Construction Association has established CaNet, or the Construction Association Network, a network of electronic plan rooms to advertise and distribute procurement opportunities to the construction industry.

Architects may provide bid documents to CANet or to other private sector electronic plans rooms such as Merx, a subsidiary of Mediagrif Interactive Technologies Inc.

Canadian Home Builders' Association (CHBA)

The Canadian Home Builders' Association (CHBA) represents Canada's residential construction industry, with more than 8,000 member firms across Canada. CHBA members represent every area of Canada's housing industry — new home builders and renovators, land developers, trade contractors, product and material manufacturers, building product suppliers, lending institutions, insurance providers, service professionals, and others.

For further information on the CHBA, contact:

Canadian Home Builders' Association
150 Laurier Avenue W., Suite 500
Ottawa, Ontario K1P 5J4
Tel: (613) 230-3060
Fax: (613) 232-8214
www.chba.ca

Construction Safety

The architect needs to understand the importance of construction safety and the environment in which construction safety is regulated. Construction safety is a provincial responsibility, and there are means both for insuring workers and for securing a safe construction site in every jurisdiction. The architect should be familiar with the requirements in the province in which each project is located.

Workplace Safety Insurance Board or Workers Compensation Boards

Construction, like many industries, is hazardous. Many serious and permanent injuries, or even deaths, occur on construction sites each year.

To minimize the proliferation of individual personal injury lawsuits resulting from workplace injuries, each province has assumed the responsibility for paying compensation to injured workers. This benefit is in return for workers surrendering their rights to pursue lawsuits or legal action. Workers compensation legislation varies province by province. In some provinces, workers compensation and health and safety are administered by one organization.

The adjudication of claims is overseen by a board or commission, which reviews each case on its own merits and awards benefits to injured workers based on pre-established policies and a scale of compensation.

To finance this system and its claims, employers are assessed based upon the degree of exposure to workplace hazards by their workers. The board establishes installments or premiums, which are to be paid by each employer for every worker in its employ. All employers are required to maintain installments in good standing to the compensation board. Failure to comply can result in significant fines or even prosecution.

Architects, just like contractors, employ workers exposed to the dangers of construction sites, and thus are required to maintain such installments in good standing. Because not all provinces require architects to pay workers compensation premiums, architects should confirm their obligations with Workers Compensation Boards in the province in which they practise.

In addition, architects — as part of the construction administration services performed for clients — should verify that all construction workers employed by contractors on each project are covered by workplace safety insurance by obtaining letters of good standing. Architects should routinely request from the general contractor a certificate of good standing issued by the local provincial workplace safety insurance board to verify that all workers are protected. Failure to do so may result in claims involving the client, the constructor, and the injured worker. Refer also to Chapter 2.3.10, *Contract Administration — Office Functions* and Chapter 2.3.11, *Contract Administration — Field Functions*.

For more information on workplace safety (compensation) insurance, contact the provincial workplace safety insurance board.

Construction Safety Associations

Some provincial construction safety associations offer a broad range of products and services to help reduce the number of job-site accidents, injuries, occupational diseases, and fatalities. In most instances, construction safety associations operate under the provincial workers compensation legislation to promote health and safety in the construction industry.

The associations operate through a system of joint labour/management committees, which:

- review worksite health and safety problems;
- make recommendations to government and other organizations for improvements to legislation and regulations affecting the construction industry.

The associations engage consultants to:

- conduct safety audits and accident analysis;
- design programs for general safety and projects for special needs.

Besides acting as a secretariat to the labour and management committees, these associations also offer training and educational programs through community colleges/cégeps and other

venues for apprentices, journeymen, trade unions, management organizations, and individual firms.

In addition, these safety associations:

- conduct research on hazardous products;
- develop safety procedures;
- compile statistics;
- publish periodicals.

For more information on activities, services, products, and publications, contact the provincial construction safety association.

Construction Industry Consultative Committee (CICC)

The Construction Industry Consultative Committee (CICC) is comprised of the chief elected and senior staff officers of the following national organizations:

- Association of Canadian Engineering Companies (ACEC);
- Canadian Construction Association (CCA);
- Construction Specifications Canada (CSC);
- Royal Architectural Institute of Canada (RAIC).

Refer to this chapter for a description of the CCA. Refer to Chapter 1.1.4, *The Organization of the Profession in Canada,* for a description of the RAIC. Refer to Chapter 1.2.3, *Consultants,* for a description of the ACEC and of the CSC.

The CICC's role is to provide a forum for the exchange of information, views, and policy on issues of general and specific interest to the construction industry. The CICC attempts to express these positions in a coordinated and consistent manner, representative of the entire construction industry, and to communicate its position to government or other public bodies.

Its administrative function is to oversee, coordinate, and direct the activities of the Canadian Construction Documents Committee (CCDC) and to promote the use of CCDC Documents.

For further information on the CICC, contact:

The Secretary
Construction Industry Consultative Committee
400-75 Albert Street
Ottawa, Ontario K1P 5E7
Tel: (613) 236-9455
Fax: (613) 236-9526

Canadian Construction Documents Committee (CCDC)

The Canadian Construction Documents Committee (CCDC) is comprised of skilled and experienced practitioners from each sector of the consulting and construction industry, to represent their sector interests. The practitioners are selected by the following national organizations:

- Association of Canadian Engineering Companies (ACEC);
- Canadian Construction Association (CCA);
- Construction Specifications Canada (CSC);
- Royal Architectural Institute of Canada (RAIC).

In addition, there are representatives from "owners" groups or organizations as well as a representative of the legal profession.

The CCDC's activities are governed by the Construction Industry Consultative Committee, which sets an annual agenda of activities for the CCDC.

The CCDC's role and responsibilities are to periodically revise, update or draft new standard forms of contract and other national, standard guides and documents, for general use by the construction industry in both the private and public sectors throughout Canada.

All decisions of the CCDC are reached through consensus. Only when consensus is achieved on an entire document, is it offered to the four national organizations with a recommendation for endorsement. All constituent bodies must endorse all CCDC-prepared documents before publication.

For further information on the CCDC, contact:

The Secretary
Canadian Construction Documents Committee
400-75 Albert Street
Ottawa, Ontario K1P 5E7
Tel: (613) 236-9455
Fax: (613) 236-9526
www.ccdc.org

Refer to "List: Canadian Construction Documents" at the end of this chapter.

Definitions

Construction: The erection, installation, extension or repair of a physical structure.

Constructor: A person who contracts with an owner or the owner's authorized agent to undertake a project; includes an owner who contracts with more than one person for the work on a project, or who undertakes the work on a project or part thereof. (National Building Code)

Journeyman: Apprentice or employee of a specialized trade contractor.

References

Canada. Industry Canada. *Sector Competitiveness Frameworks: Construction: Part 1 — Overview and Prospects*. Ottawa, Ont.: Industry Canada, 1998

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.
CCDC 21 - 2000 *A Guide to Construction Insurance*
CCDC 22 - 2002 *A Guide to Construction Surety Bonds*

Carson, John C., Q.C. *Carson's Construction Dictionary: Law and Usage in Canada*. Willowdale, Ont.: Toronto Construction Exchange, 1989.

Daily Commercial News/Journal of Commerce.
Daily Commercial News. Daily newspaper. Toronto, Ont.
Journal of Commerce. Semi-weekly newspaper. Vancouver, BC.

Forbes, J.R. *Dictionary of Architecture and Construction — French/English and English/French*. Second edition. Paris, France: Technique et Documentation — Lavoisier, 1990.

Maclean, James H. and John S. Scott. *Dictionary of Building*. Fourth edition. London, England: Penguin Books, 1995.

Revay and Associates Limited. *The Revay Report*. Published quarterly. Montréal, QC: Revay and Associates Limited.

Stein, J. Stewart. *Construction Glossary*. Toronto, Ont.: John Wiley & Sons, 1980.

List: Canadian Construction Documents

RAIC Standard Form of Contract Documents

Reference	Title	Source
RAIC Document 6	Canadian Standard Form of Contract for Architectural Services	RAIC
RAIC Document 7	Canadian Standard Form of Agreement Between Client and Architect (Abbreviated Version)	RAIC
RAIC Document 8	Short Form Agreement Between Client and Architect	RAIC
RAIC Document 9	Canadian Standard Form of Contract Between Architect and Consultant	RAIC

ACEC Agreements

Reference	Title	Source
ACEC Document 31	Agreement Between Client and Engineer	ACEC
Companion to ACEC Document 31	Guidelines for Engineering Practice	ACEC
ACEC Document 32	Sub-Consultant Agreement	ACEC
ACEC Document 33	Client and Geotechnical Engineer	ACEC
	Recommended Guidelines for Provision of Geotechnical Information in Construction Contracts	ACEC
ACEC Document 35	Project Management Services	ACEC
ACEC Document 36	Studies and Reports	ACEC
ACEC Document 39	Owner and Owner's Engineer Agreement (Design-Build)	ACEC

CCDC Contract Forms

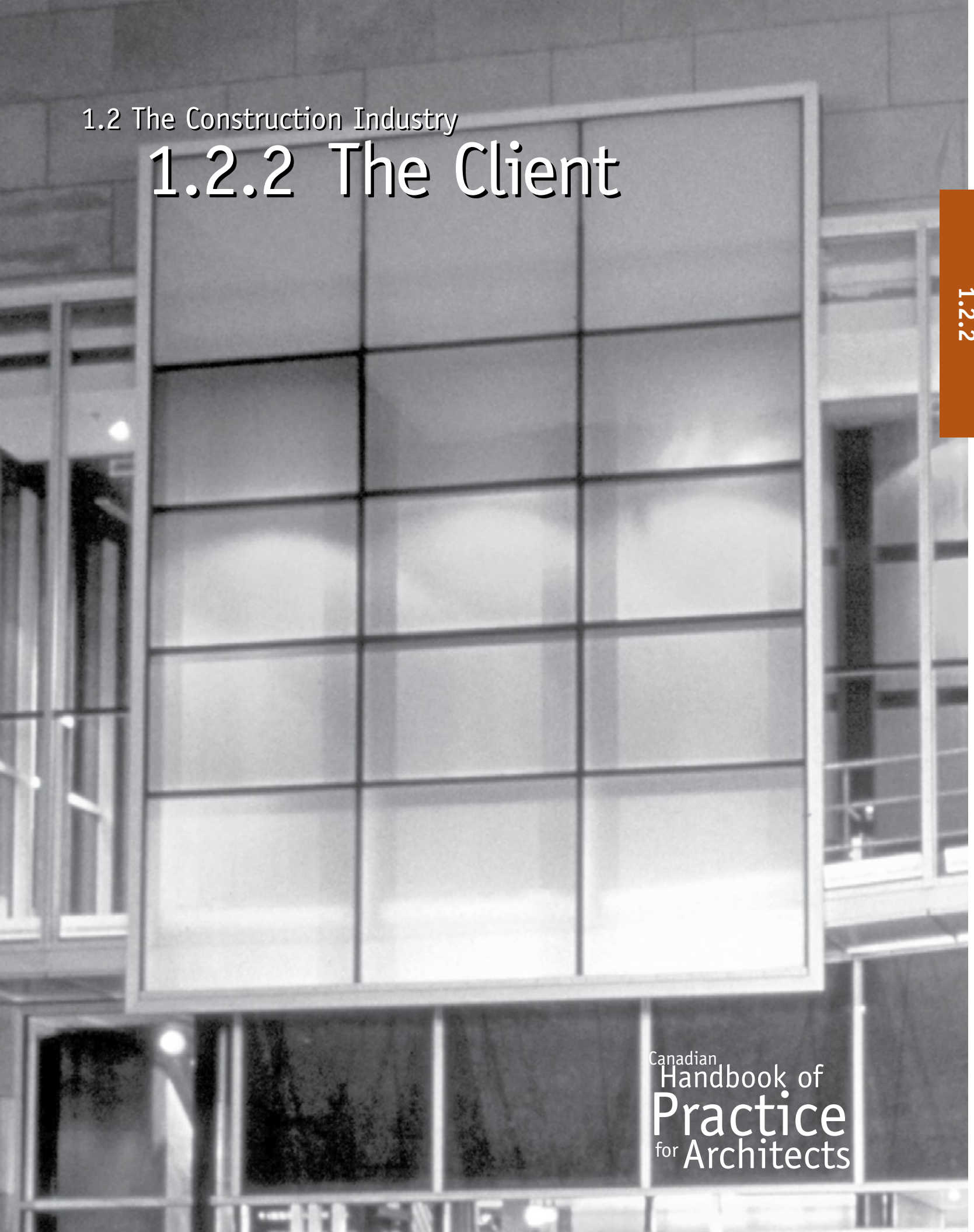
Reference	Title	Source
CCDC 2	2008 Stipulated Price Contract	CDDC
CCDC 3	1998 Cost Plus Contract	CDDC
CCDC 4	1982 Unit Price Contract	CDDC
CCDC 9A	2001 Statutory Declaration	CDDC
CCDC 9B	2001 Statutory Declaration	CDDC
CCDC 11	1996 (R2006) Contractor's Qualification Statement	CDDC
CCDC 12	1994 Project Financial Information	CDDC
CCDC 14	2009 Design-Build Stipulated Price Contract	CDDC
CCDC 15	2009 Design-Builder/Consultant Contract	CDDC
CCDC 18	2001 Civil Works Contract	CDDC
CCDC 220	2002 Bid Bond	CDDC
CCDC 221	2002 Performance Bond	CDDC
CCDC 222	2002 Labour and Material Payment Bond	CDDC

CCDC Guide Documents

Reference	Title	Source
CCDC 20	2008 A Guide to the Use of CCDC 2 - 2008 Stipulated Price Contract	CDDC
CCDC 21	2000 A Guide to Construction Insurance	CDDC
CCDC 22	2002 A Guide to Construction Surety Bonds	CDDC
CCDC 23	2005 A Guide to Calling Bids and Awarding Contracts	CDDC
CCDC 24	1996 A Guide to Model Forms and Support Documents	CDDC
CCDC 40	2005 Rules for Mediation and Arbitration of Construction Disputes	CDDC
CCDC 41	2008 CCDC Insurance Requirements	CDDC
CCDC 43	1998 A Guide to the Use of CCDC 3 - 1998 Cost Plus Contract	CDDC
CCDC 48	2002 A Guide to the Use of CCDC 18 - 2002	CDDC

CCA Standard Documents

Reference	Title	Source
CCA 1 - 2001	STIPULATED PRICE SUBCONTRACT	CCA
CCA 5 - 1988	CONSTRUCTION MANAGEMENT CONTRACT FORM	CCA
CCA 16 - 1992	GUIDELINES FOR DETERMINING THE COSTS ASSOCIATED WITH PERFORMING CHANGES IN THE WORK	CCA
CCA 17 - 1996	STIPULATED PRICE CONTRACT FOR TRADE CONTRACTORS ON CONSTRUCTION MANAGEMENT PROJECTS	CCA
CCA 25 - 2001	A GUIDE TO PROJECT MANAGEMENT SERVICES	CCA
CCA 26 - 2000	A GUIDE TO CONSTRUCTION MANAGEMENT CONTRACTS	CCA
CCA 27 - 1997	A GUIDE ON CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLANNING	CCA
CCA 28 - 1996	A GUIDE TO IMPROVING CASH FLOW IN THE CONSTRUCTION INDUSTRY	CCA
CCA 50 - 2003	A PRIME CONTRACTOR'S GUIDE TO PROJECT FINANCING AND PAYMENT SECURITY	CCA
CCA 61 - 2008	RISKS OF PRE-PURCHASING EQUIPMENT AND MATERIALS FOR CONSTRUCTION PROJECTS	CCA
CCA 81 - 2001	A BEST PRACTICES GUIDE TO SOLID WASTE REDUCTION	CCA
CCA 82 - 2004	MOULD GUIDELINES FOR THE CANADIAN CONSTRUCTION INDUSTRY	CCA
CCA 83 - 2004	ENVIRONMENTAL BEST PRACTICES GUIDE FOR HOT MIX ASPHALT PLANTS	CCA
CCA 90 - 2007	GUIDELINES FOR ELECTRONIC PROCUREMENT	CCA
Guide - 1993	RECOMMENDED GUIDELINES FOR PROVISION OF GEOTECHNICAL INFORMATION IN CONSTRUCTION CONTRACTS	CCA
Guide - 2000	A TRADE CONTRACTOR'S GUIDE AND CHECKLIST TO CONSTRUCTION CONTRACTS	CCA



1.2.2 The Client

Canadian Handbook of Practice for Architects

1.2.2

Introduction

The Client
- Owners
- Stakeholders
- Others

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- Government
- Institutional
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- Communications
- Professional Responsibility

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Checklist and Guidelines: Issuing Requests for Proposals (RFPs)

The Client

Introduction

It has been stated that good architecture is not possible without a good client. To ensure good architecture, the architect must be dedicated to establishing and nurturing successful relationships with all clients.

Clients may range from individuals to multinational corporations, from large government agencies to small private-sector firms, from offshore developers to the actual occupants of a building. The importance of a client cannot be underestimated. In contrast to a "customer" (someone who purchases goods or products), a "client" purchases professional services. This chapter discusses the various types of clients and their relationship with the architect.

The Client

In response to some sort of demand, the client decides to pursue a course of action which could result in a building project. The client:

- usually selects the prime participants;
- usually pays for the required design, construction, and subsequent operation of the facility;
- may be the owner, the user or the occupant of the building, or a combination of all three;
- participates, with other users, in an Integrated Design Process from the project outset;
- may be a Design-Builder.

In addition to understanding the distinctions between an owner, a user, and an occupant, the architect must address the requirements of each.

Owners

Owners usually hold the ownership or legal title to the land or site and to the completed building project. The owner may or may not be the client, and may or may not be the user of a building. For example:

- a government office building may be owned by the "Crown" (that is, the government);
- the client may be a government department such as Public Works and Government Services Canada (PWGSC);
- the user may be a different agency of government;
- the occupant may be public service workers and the general public.

Stakeholders

Stakeholders of any building project may include the users or the occupants of a building. Each group may have very different levels of involvement in the building.

Users are the groups or individuals who use the building. They may include the prime tenant(s) of a building or its residents. Typically, the users are concerned with the following building elements:

- location and site selection;
- life span;
- design, including comfort and safety;
- operation and maintenance.

Occupants are the individuals who occupy or use the facility on a day-to-day basis. They may be apartment dwellers, workers, secondary tenants, businesses, or the general public who may use the building as patients, restaurant diners, shoppers, tourists, etc. Occupants have no direct involvement with the design and implementation of a building project.

Illustration 1: The Client

BUILDING	Owner	User	Occupant	Client
Federal Prison	"the Crown"	prison authority (Correctional Services Canada)	guards, staff, prisoners, visitors	*(client may be **PWGSC**)*
Church	religious organization	local congregation or parish	community groups, churchgoers, clergy, staff	*(client may be represented by a **Building Committee**)*
Custom Residence	married couple	family (married couple and their two children)	family, relatives, and guests	***married couple***

Others
Many other groups may be involved in the building, including:

- building managers or facility management companies;
- local residents, neighbours, and ratepayers associations;
- financial institutions that fund the design and construction;
- Authorities Having Jurisdiction.

The architect must respond to the requirements of all these groups and, at the same time, ensure that the client's requirements are paramount.

Client Types

Each client has a unique personality, a style of operating, and a different expectation of involvement in the project. Client types include:

- corporate;
- government
- institutional and;
- small business owners or individuals.

Clients are sometimes referred to as private sector or public sector.

Some of the characteristics of each client type are listed below.

Corporate

Corporate clients are either:

- private-sector businesses that are incorporated; or
- not-for-profit corporations; or
- public-sector Crown corporations.

These clients could be small, family-owned enterprises or large, multi-national conglomerates. The method for decision-making, funding approvals, and architect selection may vary significantly from one corporate client to another. Typically, a corporation will appoint a representative to liaise with the architect and manage the project for the corporation. The client's representative may have limited authority and is usually accountable to a committee, a board of directors, or a president and chief executive officer. At times, it may be prudent to obtain a copy of a resolution of the board of directors assigning authority to the client representative.

Corporate clients:

- may be sophisticated clients with significant in-house expertise;
- may never have been involved in an architectural project;
- may include developers who are sophisticated in the design and construction process;
- tend to be business-oriented;
- expect excellent and prompt service;
- may not be accustomed to using industry standard client-architect agreements, preferring instead to use purchase orders or "in-house" contracts.

Government

Government clients can come from the municipal, regional, provincial or federal level. Legislative and regulatory procedures, as well as public accountability, will dictate the approach of government clients to building projects. The decision-making process is democratic and usually transparent but often very slow. Multiple reviews of documents and lengthy approvals are typical and architectural fees for these reviews and approvals should be negotiated. Each government agency has its own unique requirements and "bureaucratic personality," and it may be fragmented into various departments. Government clients, especially provincial and federal governments, are usually more experienced and have access to in-house professional and technical expertise to assist them with their projects.

The federal government and, increasingly, other levels of government and certain public agencies list their project opportunities and Requests for Proposals (RFPs) on a central electronic bulletin boards. Architects interested in public commissions should regularly review electronic bulletin boards such as Merx located at *www.merx.com*

Examples of typical government clients are:

- Public Works and Government Services Canada (PWGSC);
- Canada Post;
- Ontario Realty Corporation (Crown corporation);
- The Regional Municipality of Ottawa-Carleton;
- The City of Saint John;
- The Village of Saint-Joseph-de-la-Rive.

Government clients frequently have their own form of standard contract. Refer to Chapter 2.1.9, *Risk Management and Professional Liability*, for the pitfalls of non-standard contracts.

Institutional

Institutional clients typically receive monies from government, public fund-raising efforts, grants, endowments, or other external sources of funds. These clients include hospitals, school boards, museums, and social service organizations.

In some respects, institutional clients are like government clients in that they may have similar methods for selecting architects and have the same requirements for accountability (to government, public funding agencies, donors, benefactors). Some institutional clients do not have professional or technical staff. Sometimes, institutional clients include volunteers on governing boards who may be involved in building committees which liaise with the architect.

Examples of typical institutional clients are:

- Calgary Board of Education;
- Hôpital Général du/the Lakeshore General Hospital;
- Winnipeg Art Gallery;
- John Howard Society;
- central business district associations;
- ratepayers groups.

Large institutional clients sometimes have their own form of standard contracts. Refer to Chapter 2.1.9, *Risk Management and Professional Liability*, for the pitfalls of non-standard contracts.

Small Business Owners or Individuals

These clients — which include small business owners and individuals — are frequently the owner, user, and occupant of the building. Small business owners who may require premises for their business operations, or leasehold improvements to existing facilities, are typical private clients. Individuals, couples, and families who want to renovate an existing home or construct a new custom home are also typical of this client type.

Informal procedures and inexperienced clients may mean that the architect has to be more rigorous about documentation, communications, expectations, and presentation. The architect may find that these small business owners or individual clients will need to be educated and guided through the design and construction process. Others may be small developers or builders who may be more knowledgeable and demanding.

Client Relationships

Communications

It is important for the architect to understand the client and his/her motives for constructing the building and to establish regular, consistent and clear lines of communication. The architect must clearly define and outline the design and construction process in order to avoid unrealistic expectations. The architect should not submit to ill-informed client requests nor neglect to inform the client of project problems and their consequences. As well, the architect must develop and analyze all options, and obtain the client's support for, and approval of, the solution to a problem.

Professional Responsiblity

Because the client has retained a professional, it is assumed — and upheld by legal precedent — that the client is not knowledgeable and is dependent on the guidance of a professional, in this instance, the architect. When dealing with the client, the architect must exercise professional judgement at all times.

Clients differ in their level of involvement in architectural projects as well as in the role they expect of architects. Sometimes the architect is given considerable latitude and autonomy; on the other hand, the architect may have a very narrowly-defined role and be able to make only a few recommendations.

Managing client relationships and personalities is similar to other human relationships and the management of people and human resources. Refer to the many management and business publications for information on developing and sustaining client relationships.

Client Associations

A common interest in owning, managing, maintaining, and operating buildings has led to the formation of client associations, the best known of which is the Building Owners and Managers Association.

Building Owners and Managers Association (BOMA)

BOMA Canada is an affiliated member of BOMA International, which was founded in 1907 as the National Association of Building Owners and Managers. The association assumed its present name in 1968 as it broadened its reach to include Canada and other affiliates around the globe. Today, BOMA International represents over 100 North American and nine overseas affiliates in Australia, Brazil, Finland, Indonesia, Japan, Korea, the Philippines and South Africa.

BOMA is primarily concerned with commercial real estate, that is office buildings, and its principal members own or manage commercial office space. Associate members provide the goods and services needed to operate these buildings.

BOMA Canada's Mission is to represent the Canadian commercial real estate industry on matters of national concern, to develop a strong communications network between its local associations, BOMA International and other real estate associations and promote professionalism of its members through education programs and effective public relations activity.

The association publishes numerous research and reference materials including the *Standard Method for Measuring Floor Area in Office Buildings*, the standard known as ANSI/BOMA Z65.1-1996 and the BOMA/SIOR 2001 *Standard for Measuring Floor Area in Industrial Buildings*.

The BOMA Canada web site is found at:
www.bomacanada.ca

Others

Building Owners and Managers Institute (BOMI)
Building Owners and Managers Institute (BOMI) of Canada was founded in 1974 by members of the Building Owners and Managers Association (BOMA) who recognized a need for quality education in the commercial property industry. Course materials for the RPA, FMA, SMT, and SMA designation programs are produced in the United States by BOMI, headquartered just outside of Annapolis, Maryland. To ensure that these programs include the appropriate Canadian content, BOMI Canada works closely with the Institute and Canadian authors and reviewers.
www.bomicanada.com

The Association of Higher Education Facilities Officers (APPA)
The Association of Higher Education Facilities Officers (APPA) serves facility planners in the education community, particularly universities and colleges.

APPA
1643 Prince Street
Alexandria, VA
22314-2818 U.S.A
Tel: (703) 684-1446
Fax: (703) 549-2772
www.appa.org

The International Facility Managers Association (IFMA)
The International Facility Managers Association (IFMA) has a certification program for Certified Facility Managers (CFMs) and conducts research, provides educational programs, recognizes facility management degree and certificate programs and produces World Workplace, the world's largest facility management conference and exposition.

IFMA
IFMA Headquarters
1 E. Greenway Plaza, Suite 1100
Houston, Texas
77046-0194 U.S.A.
Tel: (713) 623-4362
Fax: (713) 623-6124
www.ifma.org

Council of Educational Facility Planners International (CEFPI)
The Council of Educational Facility Planners (CEFPI) is a professional association whose sole mission is improving the places where children learn. CEFPI members — individuals, institutions and corporations — are actively involved in planning, designing, building, equipping and maintaining schools and colleges.

CEFPI
9180 E. Desert Cove, Suite 104,
Scottsdale, Arizona
85260 U.S.A.
Tel: (480) 391-0840
Fax: (480)391-0940
www.cefpi.org

Client-Architect Agreements

When providing professional services to a client, the architect should always have a written agreement which outlines:

- the services provided;
- the fee for the services;
- the various terms and conditions which govern the agreement (including client responsibilities).

At the outset, architects should provide the client with a detailed explanation about what is included and **not** included in the agreement. Most disputes occur at the end of the project due to the differing expectations of the parties to the agreement.

The *Canadian Standard Forms of Contract Between Client and Architect (RAIC Documents Six and Seven)* outline certain client responsibilities. The client may choose to retain the architect as prime consultant, with the architect retaining the engineers and other necessary consultants as sub-consultants (see Illustration 2). On the other hand, the client may retain the architect separately and also retain the engineers directly through separate agreements (see Illustration 3). In this instance, the architect must ensure that the architect's services and fees for coordination and management of the consultants are clearly understood and agreed to.

Responsibilities

Frequently, the architect may need to inform the client of the need for timely and accurate information and approvals during the course of the project. The client is responsible for providing the architect with:

- a program or design brief (refer to Chapter 2.3.4, *Pre-design*);
- a construction budget;
- required information, surveys, reports, and other specialist professional services.

The architect often assists the client in obtaining some of this necessary information.

The services of many of the specialist consultants required at the pre-design phase of a project, such as geotechnical engineers and environmental consultants, are not covered in

most professional liability insurance policies for architects. As a result, the architect should ensure that the client retains these consultants directly. However, the architect may:

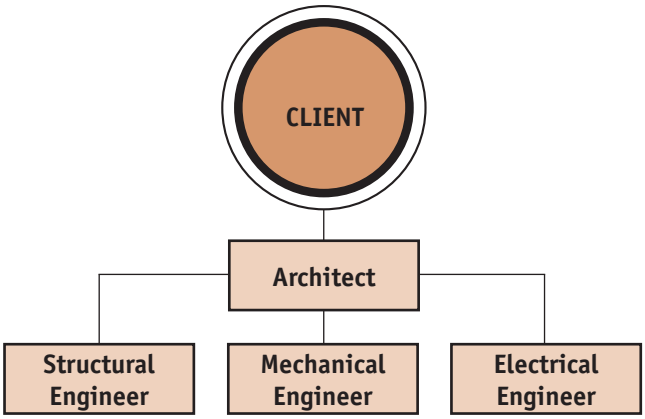
- assist the client in the engagement of these specialists;
- identify the information required, such as a typical grid for topographic survey or the location and size of a building for the geotechnical engineers.

Client Representative

To ensure clear and non-conflicting instructions from the client, only **one voice** should give direction to the architect. Any other situation would be unwieldy and inefficient, for example, establishing a building committee for a project where the architect's day-to-day contact is with all members of the committee.

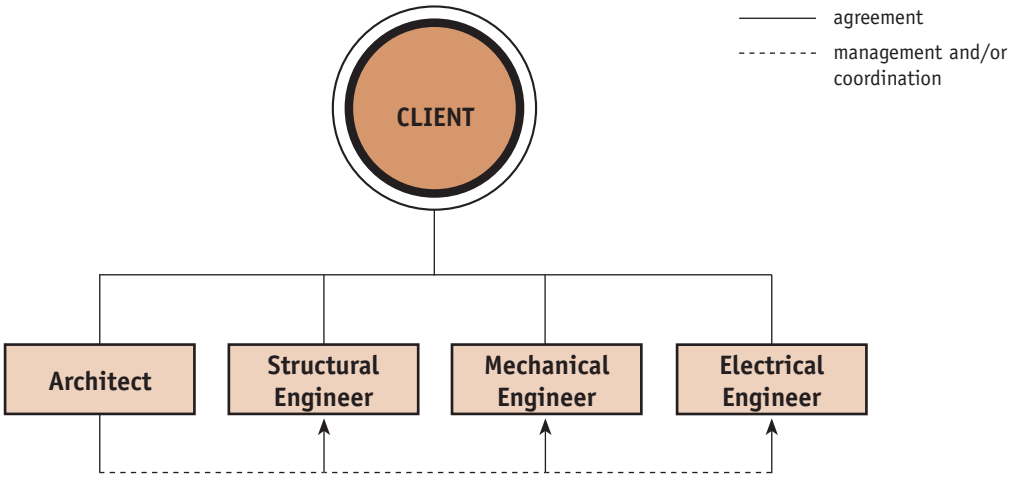
The standard forms of contract indicate that one of the client's responsibilities is to appoint a representative or to "authorize in writing a

Illustration 2: Architect as Prime Consultant



There are a variety of other methods of project delivery such as Design-Build, Construction Management and Public Private Partnerships. In each, the relationship between the architect and client varies significantly. Refer to Chapter, 2.3.2, Types of Construction Project Delivery.

Illustration 3: Separate Agreements:
Architect as Managing and Coordinating Consultant



person to act on the client's behalf and define that person's scope of authority with respect to the Project when necessary." Sophisticated clients, or those who are very involved in the construction process, frequently have a professional engineer or architect as a representative. Others, such as private or individual clients, may act as their own representatives. Volunteer committees may appoint one individual to liaise with the architect. It is important to establish the client's representative early in the project.

Definitions

Client: A person using the services of a professional (adapted from the *Oxford Dictionary*).

Owner: The person or entity identified in the agreement. The term "owner" means the owner or the owner's authorized agent or representative as designated to the contractor in writing, but does not include the consultant (from CCDC 2, *Stipulated Price Contract*).

Checklist and Guidelines: Issuing Requests for Proposals (RFPs)

This checklist is to be used as a guide for the building owner or client who needs to select an architect. The checklist describes the recommended process that you, as the client or owner, should follow when issuing a **Request for Proposals** (RFP). The checklist is based on principles commonly found in Comparative Selection or Quality Based Selection (QBS). For large or complex projects, you may decide that Technical Proposals are also required. The process for requesting and evaluating these technical proposals is described in step 11 and, if required, should occur following step 6.

Note 1: An excellent primer for choosing and engaging an architect can be found on the website of the Royal Architectural Institute of Canada at www.raic.org (click on Architecture and Architects, then Choosing an Architect)

Note 2: Another reference, with sample forms for use with Quality Based Selection process, may be downloaded from the Ontario Association of Architects website: www.oaa.on.ca (click on Find an Architect, then Selecting an Architect)

Note 3: Most of the provincial associations of architects include within their websites information on **Finding an Architect** *and on* **How to Find, Select, and Engage an Architect using Quality Based Selection (QBS)**

1. Describe the **Scope of Work** (refer to Quality Based Selection Form A-1):
   - ❑ your (the client's) name, including a short history of your organization or agency and the events that prompted the project;
   - ❑ project name and location;
   - ❑ name of contact person: the only person authorized to respond to requests for clarifications or project information;
   - ❑ names and roles of selection committee members (such as board, staff, committee, citizen group);
   - ❑ other construction on the same site, but not part of this RFP;
   - ❑ completed studies or surveys relevant to the project, which will be made available to short-listed architects prior to their interviews;
   - ❑ further studies required prior to commencement of design;
   - ❑ program of requirements describing the intended size, function and occupancy;
   - ❑ any other requirements such as demolition, additions, renovations, or sustainable design criteria, land use or site selection considerations;
   - ❑ anticipated budget (if known);
   - ❑ anticipated form of project delivery or construction procurement (if known);
   - ❑ anticipated schedule for design, construction and occupancy;
   - ❑ any additional or unique requirements;
   - ❑ description of the architect selection process (as indicated in 2 below).

2. **Establish policies, procedures and time frame for the Selection Process** (refer to Form A-2).
   You (the client) should:
   - ❑ be prepared to commit adequate time and resources to evaluate submissions thoroughly;
   - ❑ select and invite appropriate and competent individuals to serve on the selection committee and confirm their availability on the dates chosen;
   - ❑ for large or complex projects, give serious consideration to retaining an architect to aid in preparing the selection process and time frame;
   - ❑ determine criteria for evaluating Expressions of Interest and for weighting and scoring proposals;
   - ❑ confirm that late submissions will not be accepted.

3. **Compile List of Architects** to be invited to submit Expressions of Interest:
   - ❑ consider the number of firms which can reasonably be evaluated;
   - ❑ obtain architects' names:
   - ❑ from the RAIC website (refer to "*Find an Architect*") or from the RAIC printed directory;
   - ❑ from the directory (online or printed) of the provincial licensing body;
   - ❑ by advertisement in local or national newspapers, or professional journals;
   - ❑ by consulting colleagues for their recommendations, when appropriate.

   [Note: The list may be developed based on the architects' geographic location, or if appropriate, a broader representation.]

4. **Request Expressions of Interest** (refer to Form A-3). The following steps should be taken:
   - ❑ prepare a memo, addressed in alphabetical order, to all architects selected for invitation;
   - ❑ list all information required to be included with each architect's Expression of Interest;
   - ❑ attach statements describing scope of the work (Form A-1) and time frame (Form A-2);
   - ❑ state the maximum number of pages to be provided by the architect in a Expression of Interest (usually 3-5 pages);
   - ❑ authorize the contact person to provide names of persons on the selection committee, if requested;
   - ❑ ensure that each invited architect receives exactly the same information.

5. **Evaluate Expressions of Interest**, ensuring that you:
   - ❑ return, unopened, any submissions delivered after deadline;
   - ❑ thoroughly review all Expressions of Interest based on pre-determined criteria.

6. Establish a **Short List**, by:
   - ❑ contacting references;
   - ❑ developing a short list of three to five architects who will be invited to submit Technical Proposals and/or to be interviewed and notifying them;
   - ❑ contacting architects not short-listed, expressing appreciation for their efforts and naming those who have been short-listed (refer to Form A-4);

   [Note: Decide whether or not the definition and complexity of project justifies requiring short-listed architects to submit Technical Proposals or to proceed directly to interviews] (refer to step 11 below on procedures for obtaining Technical Proposals).

7. **Inform Short-listed Architects** (refer to Forms A-5, A-6 and A-7). You should:
   - ❑ establish a date for tour of site, if appropriate, or provide short-listed architects with site surveys and directions to visit site independently;
   - ❑ ensure that all short-listed architects receive exactly the same information arising from any questions;
   - ❑ provide, to all short-listed architects, a list of interview criteria and questions, explanation of scoring and selection process, the date, place and time for interviews and the names and titles of members of the interview committee. *[Note: Advance availability of this information ensures consistent and fair comparisons of all candidates];*
   - ❑ do not request sketches, cost estimates or suggested compensation;
   - ❑ distribute feasibility studies or other reports, project functional program, or other background information to each short-listed architect or notify them where the documents are available for their review.

8. **Interview Short-listed architects:**
   The purpose of the interviews is to:
   - ❑ eview the architects' expertise and relevant experience;
   - ❑ evaluate their management approach, design personnel and consultants;
   - ❑ compare different approaches to the design process, interpretation or understanding of the specific requirements of your project and compatibility with your expectations;
   - ❑ explore issues relevant to the particular project, without being compromised by pre-conceived design solutions.

Direct interaction between the client/user and the architect is essential for the development of a design that fully meets your (the owner's) needs, therefore it is important for the project's intended users to participate in the interviews. Interviews may take place in the offices of short-listed firms or, alternatively, in your own premises.

You, the client, should:

- ❑ only interview the architects who have been short-listed;
- ❑ not consider sketches or other design work if such material is presented during the interview. At this early stage, architects will not yet have engaged in the essential interaction between architect and client which must precede the development of a valid design solution;
- ❑ not discuss the architects' compensation during these interviews;
- ❑ discuss in advance with each short-listed architect what presentation facilities they may require and confirm whether the interview room has adequate requirements (can be blacked-out, projector screen, internet connection or other);
- ❑ if possible, provide two similar interview rooms so that one group can set up equipment while another group is being interviewed;
- ❑ schedule 45 minutes for each architect's presentation, questions and answers, with 15 minutes between interviews, which allows time for the interview committee to discuss their initial impressions privately before the next interview begins;
- ❑ schedule all interviews on one day (or on consecutive days, if that is not possible) to assist the committee to achieve its objective of comparing all presentations consistently and fairly.

9. **Ranking the Short-listed architects:**
   - ❑ rank each architect using the weighting and scoring established earlier;
   - ❑ summarize scores on Group Interview Evaluation Form A-7, to determine ranking in order of preference and to document a record of the selection process;
   - ❑ inform the architects of the committee's decision on ranking as soon as possible, indicating that negotiations will commence immediately with the highest-ranked architect.

10. **Negotiate an agreement with the highest-ranked architect:**
    You, the client, should develop a detailed, comprehensive scope of services jointly with the highest-ranked architect, following which the architect will submit a detailed project work plan (a plan that itemizes the schedule for architectural services, key milestones and deliverables), listing consultants and the role and responsibilities of all members of the design and client teams.

    - ❑ Refer to the following documents for a complete list of architectural services can be found in the Canadian Handbook of Practice for Architects, *Chapter 2.1.10, Architectural Services and Fees*:
      - **Checklist: Scope of Services**
      - **Checklist: Supplemental Architectural Services**

    - ❑ Once the scope of services and work plan are agreed to, the architect will submit a compensation proposal for review and negotiation, referring to the Canadian Standard Form of Agreement between Client and Architect. Note that the architect's compensation can be:
      - a percentage of construction cost,
      - a fixed fee,
      - based on hourly rates, or
      - a combination of the above;

    (Reimbursable expenses are additional and should not be considered in the evaluation).

    - ❑ Negotiate the scope of services and compensation with one architect at a time; if negotiations cannot be successfully completed with the first-ranked architect, they are abandoned, and negotiations begun with the second-ranked architect. Once agreement is reached, incorporate all the negotiated details into a written contract, which protects the interests of both client and architect.
    - ❑ Finally, notify all the short-listed architects who were not selected, indicating the order of final ranking, using Form A-11.

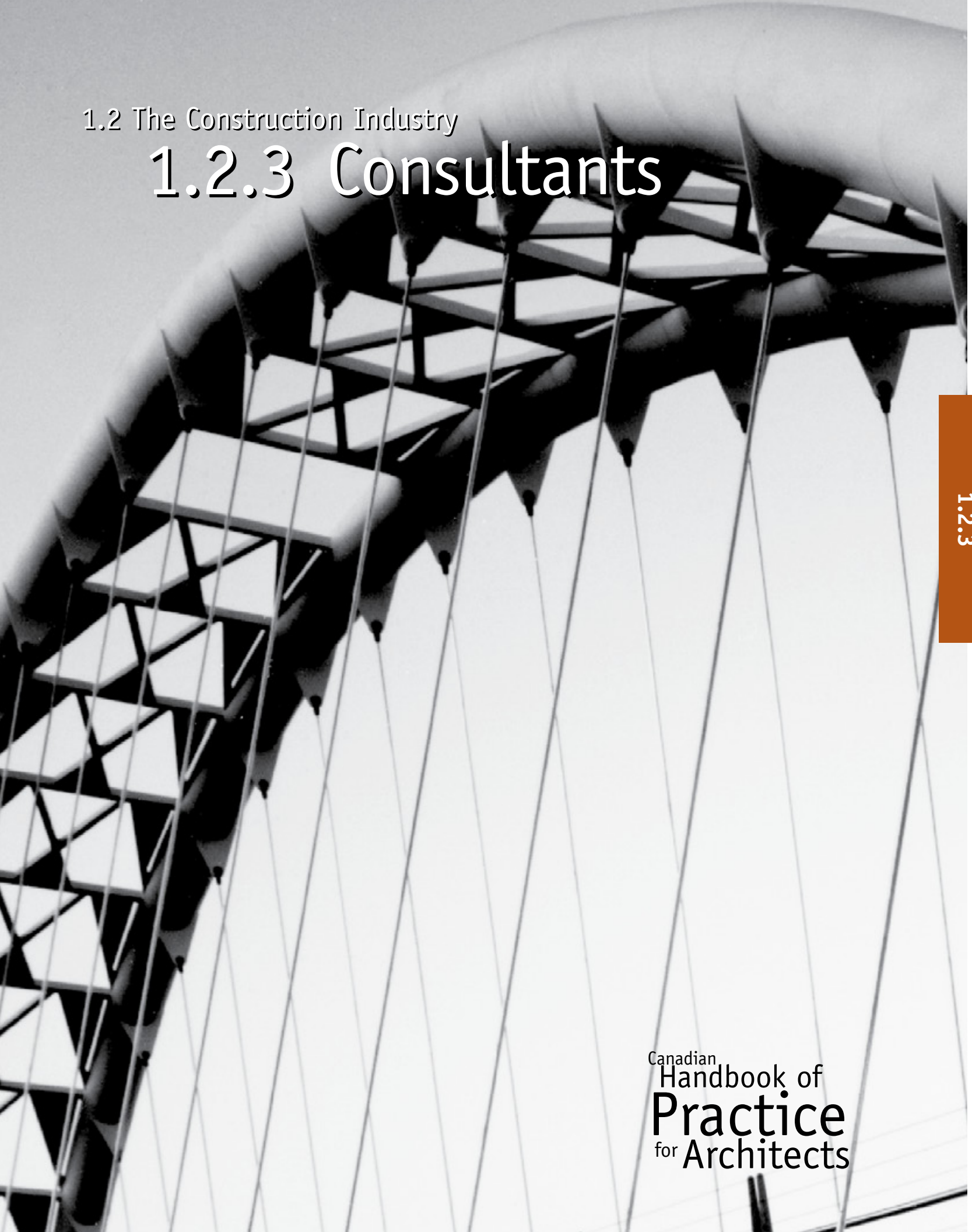
11. **Technical Proposals:** *follow these additional procedures if the definition and complexity of your project justifies requiring short-listed architects to submit Technical Proposals:*
Be aware that the preparation and evaluation of Technical Proposals will require the commitment of significant expense and time for each short-listed architect as well as for your technically experienced staff (or if they are not available, the engagement of specialist consultants).

    If you have concluded that Technical Proposals are required, ensure that the request:
    - ❑ includes all technical areas to be addressed (refer to Form A-8);
    - ❑ establishes a reasonable and appropriate maximum length for the submission;
    - ❑ lists interview criteria and questions;
    - ❑ provides an explanation of the scoring and selection process, the date, place and time for interviews and the names and titles of members of the interview committee.

    (Advance availability of this information gives the best possible assurance that consistent and fair comparisons between candidates will be made).

Review of Technical Proposals should precede interviews (steps 7 and 8) unless, you are already familiar with all the short-listed architects, their staff and their consultants, in which case, you may determine that interviews will not be necessary. Ensure that the Technical Proposals have been reviewed and scored before the interviews take place, leaving time for clarifications during the interview and incorporate the results of the review and ranking of Technical Proposals (recorded on Forms A-9 and A-10) into overall ranking.

1.2.3 Consultants



1.2.3

Introduction

Types of Consultants
- Engineering Consultants
- Specialist Consultants

Agreements with Consultants

Managing and Coordinating Consultants

Consultant Associations
- Association of Consulting Engineers of Canada (ACEC)
- Construction Specifications Canada (CSC)

Testing Agencies and Inspection Services

Definitions

References

List: Types of Consultants on the Design Team

List: Selected National Associations of Consultants

Checklist: Coordinating Consultants

Consultants

Introduction

Architects are required to provide a wide range of services and expertise in the course of designing and coordinating a building project, and they usually do so with the help of consultants. Projects in which the architect is the sole individual responsible for design are rare, with small residential and commercial projects probably the only examples. The size, scope of services, or complexity of the project usually exceed the architect's qualifications, skills or ability, making it necessary to seek the expert advice of others. The kind and amount of expertise required will vary with each building type or building classification and with the size and scale of the project.

A significant part of the practice of architecture, therefore, involves the coordination of information, advice, and designs provided by consultants who are knowledgeable in various fields. The architect usually provides the leadership, as well as the management and coordination skills, to synthesize the services of various consultants.

Whether acting alone or with numerous consultants, the architect's goal is to provide seamless service to the client, in addition to well-coordinated construction documents and a smooth execution of the construction or project delivery. Consultants are full participants in the **design team**.

It is now common for the architect and the consultants to work together from the very begininning of a project through an Integrated Desgn Process to achieve the best sustainable design solutions.

Types of Consultants

Architects engage a wide variety of consultants. Some are professionals licensed under statute, such as engineers, who must meet rigorous requirements for membership in professional associations (see "Consultant Associations" below), as do architects. Others provide technical services such as CAD drafting or advice on hardware. Still others may be specialists in a particular field such as landscape architecture, marketing, interior design or kitchen equipment.

Engineering Consultants

The consultants most often engaged by architects are structural, mechanical, and electrical engineers. These engineers could be considered **basic** consultants. Architects are usually engaged by the client as **prime** consultants for most building classifications (building codes classify buildings by major occupancies). The exception is industrial building projects, where the prime consultant is typically an engineer.

In Québec, the engineers are usually engaged directly by the client. There is usually no contractual link between architects and engineers.

There are firms in Canada with some or all of the basic engineering consultants and architects within one organization. Such multi-disciplinary firms are not common in Québec.

Other engineers frequently consulted for building projects are acoustical engineers, civil engineers, and engineers who specialize in the science of building envelopes. Others include geotechnical engineers, seismic engineers, traffic engineers, and environmental remediation engineers. Geotechnical and environmental remediation

engineers and certain other specialists (such as land surveyors) should be retained directly by the client because architectural professional liability insurance policies do not typically cover these services.

Specialist Consultants

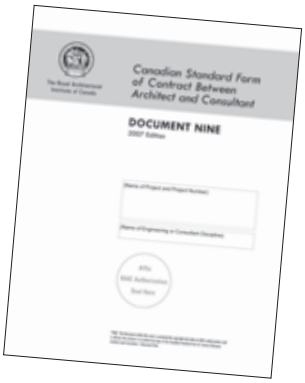
Building projects often require specialist consultants. Many of them are members of an association or may be certified to perform their services. This is typical of specification writers, building envelope consultants, interior designers in certain jurisdictions, and others. Some consultants gain expertise through years of specialization and experience. Many architects become specialist consultants themselves. Refer to "List: Types of Consultants on the Design Team" at the end of this chapter.

Agreements with Consultants

The architect should execute a written agreement with all consultants that he or she directly engages. Before such an agreement is executed, the architect should confirm that each consultant can meet both the requirements of the client and the architect. These include:

- licensing requirements in the jurisdiction of the project;
- professional liability insurance requirements;
- capacity to perform the services;
- ability to meet the project time schedules and budget.

The use of the *Canadian Standard Form of Contract Between Architect and Consultant: RAIC Document Nine* is recommended for an agreement with engineering consultants and other design professionals such as other architects, landscape architects, interior designers, and food service consultants. Document Nine is **not** a "stand-alone" agreement and it is expected that the "prime agreement" (RAIC Document Six or Seven), or alternatively the relevant portions of the prime agreement, be appended to it. This ensures that the consultants have a full understanding of the expected and required services.


Canadian Standard Form of Contract Between Architect and Consultant

DOCUMENT NINE

The architect should prepare a separate agreement for other consultants such as those with a limited role, who may not carry professional liability insurance and who may not be design professionals. This agreement should clearly outline the services required as well as the fees for these services, and may have to include clarification on the ownership of the copyright. The architect should ensure that the copyright on the limited consulting services provided for an architectural project is assigned in writing to the architect.

Managing and Coordinating Consultants

One of the architect's important roles is to manage and coordinate the work of consultants, whether they are retained directly by the architect or separately by the client. It is important to start the process early and to obtain input from the consultants through an Integrated Design Process starting prior to schematic design. Also, it may be helpful to involve certain consultants in project planning and budgeting prior to commencing design work. Consultants usually work as independent professionals with a significant degree of freedom. However, during the entire course of the project, the architect:

- monitors consultant performance;
- ensures consultants' ongoing commitment to the project;
- motivates consultants;
- provides recognition to consultants.

The coordination of consultants may also include:

- identifying project goals and environmental design targets;
- establishing budgets, design criteria, and time schedules;
- arranging meetings;
- routing all communications;

- setting standard formats for documentation (primarily working drawings and specifications).

Refer to "Checklist for the Management of the Architectural Project" in Chapter 2.3.1, *Management of the Project*, for a list of tasks required to coordinate and manage consultants at each phase of the project.

Consultant Associations

Most of the specialists which an architect consults are organized into professional, para-professional or technical associations. Because of the large number of such associations in Canada, this Handbook will outline only those associations which participate on the Construction Industry Consultative Committee (CICC) and the Canadian Construction Documents Committee (CCDC). These four associations are:

- Association of Canadian Engineering Companies (ACEC);
- Canadian Construction Association (CCA);
- Construction Specifications Canada (CSC);
- Royal Architectural Institute of Canada (RAIC).

Refer to Chapter 1.2.1, *The Construction Industry,* for the composition and role of the CICC and the CCDC, as well as for a description of the Canadian Construction Association (CCA).

Refer to Chapter 1.1.4, *The Organization of the Profession in Canada,* for a description of the Royal Architectural Institute of Canada (RAIC).

The ACEC and the CSC are discussed below.

Association of Canadian Engineering Companies (ACEC)

Founded in 1925, ACEC is the national association of consulting firms that provide engineering and other technology-based intellectual services to the built and natural environment. Member companies offer professional engineering services world wide to private sector and government clients. ACEC's mission is to promote and safeguard the business and professional interests of the Canadian consulting engineering industry in Canada and abroad.

The Association's membership consists of approximately 600 independent consulting engineering firms and 11 provincial and territorial member organizations. Members range in size from single-person operations to multi-national companies.

Refer to "List: Selected National Associations of Consultants," located at the end of this chapter, for the ACEC's address and Web site.

Construction Specifications Canada (CSC)

Construction Specifications Canada (CSC) is a national multi-disciplinary, non-profit association with chapters across Canada. CSC is committed to ongoing development and delivery of quality education programs, publications and services for the betterment of the construction community.

CSC liaises with its sister U.S. organization, the Construction Specifications Institute (CSI), and works with the CSI to develop and maintain the MasterFormat™ system.

CSC publishes *Construction Canada* magazine and the TEK-AID series of reference documents which can assist architects in developing specifications. CSC also offers a variety of certification programs, including:

- the Certified Construction Contract Administrator (CCCA);
- the Certified Technical Representative (CTR);
- Registered Specification Writer (RSW).

Refer to "List: Selected National Associations of Consultants," located at the end of this chapter, for the CSC's address and Web site.

Testing Agencies and Inspection Services

During the construction administration phase of a project, architects occasionally require expertise to test components of the construction (such as the compaction of sub-soils, concrete samples) or to conduct detailed inspections (for roofing systems, welds, piping, etc.). This expertise is discussed in Chapter 2.3.11, *Contract Administration — Field Functions*.

Refer also to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*.

Definitions

Consultant: One from whom advice is sought. The requirements for licensing vary depending on the professional field of activity. (adapted from *Carson's Construction Dictionary*)

Engineer: A professional skilled in the design, development, and construction of physical works. To practise or hold oneself out to the public as an engineer, the individual must be licensed under provincial or territorial legislation.

Prime Consultant: The consultant that is retained directly by the client for the provision of the main part of professional services; these services usually include management and coordination of sub-consultants and other consultants engaged directly by the client or others.

Sub-consultant: The consultant that is retained by (or under contract to) the prime consultant.

References

Construction Specifications Canada. *Construction Canada*. Published six times a year. Toronto, Ont.

RAIC Document Nine - Canadian Standard Form of Agreement Between Architect and Consultant: Ottawa, Ont.

List: Types of Consultants on the Design Team

Specialist Consultants:

- Acoustical consultant
- Airport consultant
- Architectural historian
- Art consultant
- Building code consultant
- Building envelope consultant
- Computer or CAD consultant
- Conservation or Heritage architect
- Construction manager
- Cost consultant
- Demographer
- Economist
- Education consultant
- Elevator consultant
- Energy management consultant
- Environmental consultant or ecologist
- Facilitator
- Facilities manager
- Food service/kitchen consultant
- Graphic artist
- Hardware consultant
- Information Technology consultant
- Hospital consultant
- Interior designer
- Laboratory consultant
- Land surveyor
- Landscape architect
- Lighting consultant
- Marketing consultant
- Programmer
- Psychologist
- Public relations consultant
- Quantity Surveyor
- Realtor
- Scheduling Consultant
- Security consultant
- Signage or graphics consultant
- Sociologist
- Specifications writer
- Sustainability or LEED® Consultant
- Technologist
- Theatre consultant
- Translator
- Transportation planner
- Urban and regional planner
- Urban designer
- Value engineering consultant
- Wayfinding consultant
- Wind/snow studies consultant

Engineering Consultants:

- Acoustical engineer
- Civil engineer
- Electrical engineer
- Environmental engineer
- Geotechnical engineer
- Hydrological engineer
- Mechanical engineer
- Process engineer
- Seismic engineer
- Structural engineer
- Traffic engineer

List: Selected National Associations of Consultants

Association of Canadian Engineering Companies (ACEC)
616-130 Albert Street
Ottawa, Ontario K1P 5G4
Tel: (613) 236-0569
Fax: (613) 236-6193
www.acec.ca

Canadian Construction Association (CCA)
75 Albert Street
Ottawa, Ontario K1P 6A4
Tel: (613) 236-9455
Fax: (613) 236-9526
www.cca-acc.com

Engineers Canada
180 Elgin St., Suite 1100
Ottawa, Ontario K2P 2K3
Tel: 613-232-2474
Fax: 613-230-5759
www.engineerscanada.ca

Canadian Institute of Quantity Surveyors (CIQS)
90 Nolan Court, Unit 19
Markham, ON L3R 4L9
Tel: 905-477-0008
Fax: 905-477-6774
www.ciqs.org

Canadian Society of Landscape Architects (CSLA)
P.O. Box 13594
Ottawa, Ontario
K2K 1X6
Tel: (613) 622-5520
Fax: (613) 622-5870
www.csla.ca

Construction Specifications Canada (CSC)
120 Carlton Street, Suite 312
Toronto, ON, M5A 4K2
Tel (416) 777-2198
Fax (800) 668-5684
www.csc-dcc.ca

Interior Designers of Canada (IDC)
220 - 6 Adelaide Street East
Toronto, Ontario, M5C 1H6
Tel: 416.594.9310
Fax: 416.921.3660
www.interiordesigncanada.org

Checklist: Coordinating Consultants

Notes
'Sub-consultants' include consultants engaged by the architect, such as structural, mechanical & electrical engineers, landscape architects, and other specialists. *[In Québec, engineers are usually engaged directly by the client.]* Consultants which may be engaged by the architect on behalf of the client but whose fees are paid by the client, either directly or through allowances, are often included in the contract price. Examples are land surveyors, geotechnical engineers, testing and inspection firms.
For convenience, these are all referred to as 'consultants' in this Checklist.

This Checklist is based on the traditional contractual arrangement where the client engages the architect, who then engages the necessary sub-consultants. The relationship between architect and sub-consultants is constrained when the consultants are engaged directly by the client or when the architect is engaged as a sub-consultant to an engineer who acts as the prime consultant. The basic principles of coordination do not diminish under such alternative contractual arrangements and should be affirmed and clarified by the architect as early as possible.

Comments, clarifications or recommendations are in *italics*
Use of a forward slash (/) signifies *and* or *or*

Refer also to Chapter 1.2.3 *Consultants* and "Checklist for the Management of the Architectural Project" in Chapter 2.3.1 *Management of the Project*

Pre-agreement

1. Define expectations:

(may apply only to contracts where consultants are engaged as sub-consultants to the architect)

- ❑ Before beginning negotiations with potential consultants prepare clear definition of expected consultant performance for each discipline, including:
  - extent of participation by consultant during design/documentation stages
  - knowledge of/commitment to current practice in:
    - energy efficiency
    - sustainable design and integrated design approach
- ❑ contract administration procedures, including:
  - reporting
  - review of change quotations
  - shop drawing review
- ❑ field review practices, such as:
  - attendance at site meetings
  - prohibition of deal-making recorded/ unrecorded
  - written records/reports
- ❑ review past performance of previously engaged consultants
- ❑ review unsolicited offers of service from consultants not previously engaged
- ❑ seek confidential recommendations on unfamiliar consultants from colleagues/clients
- ❑ prepare short list of consultants selected (formerly engaged/new) to interview
- ❑ develop score sheet for use during first interviews for consistent recording/rating of consultants' responses

2. Interviews:

(*separate preliminary discussions with each of selected consultants to confirm that consultant understands/accepts architect's performance expectations*)

- ❑ encourage consultant to describe his or her procedures in dealing with architects
- ❑ explore consultant's understanding of collaborative/participatory process
- ❑ clarify how architects use the word 'design': (*engineers apply a different meaning to the word, which can lead to serious misunderstandings. Some engineering consultants may be unable, or reluctant, to comprehend the architect's expectation that the engineer should participate in/contribute to the design development of the project*)
- ❑ confirm adequate professional liability insurance
- ❑ make notes on score sheet

3. Following Interviews:

- ❑ review score sheets for each consultant
- ❑ eliminate unsuitable consultants
- ❑ prepare formal Request for Proposals (RFP) letter for selected list of consultants
- ❑ *different letters will be required for each discipline, but each should include:*
  - statement of expectations, confirming topics presented during interview (*performance expectations should be stated in detail in initial RFP letter*):
    - description of project, giving as much information as possible:
    - project name/client/location site
    - program
    - budget
    - target date for completion
- ❑ proposed schedule for design/documentation/ bidding & negotiation/construction
- ❑ fee basis, such as:
  - lump sum
  - percentage
- ❑ [task-based *using procedures set out in Mastering the Business of Architecture, published by the OAA*]
- ❑ request to confirm/provide:
  - acceptance of performance expectations
  - ability to meet timetable
  - proof of professional liability insurance

4. Appointment of consultants:

- ❑ review proposals
- ❑ verify acceptance of expectations/adequate professional liability insurance
- ❑ analyse any additional conditions agree or reject
- ❑ accept best proposal (*may not be the cheapest if expected performance/understanding are superior*)
- ❑ notify successful consultants/sign formal agreements (RAIC Document Nine –Canadian Standard Form of Contract Between Architect and Consultant)
- ❑ advise unsuccessful consultants (*this maintains good relations: you may want to consider engaging them in future)*
- ❑ include selected consultants in:
  - proposal to potential client when responding to an RFP or
  - notification to client when already engaged

Schematic Design:

- ❑ First meeting with consultants:
  - (*preferably with all three engineering disciplines present so that architect's expectations for coordination between consultants, as well as between each consultant and architect, can be stated/ confirmed to all parties together)*
- ❑ clarify how architects define 'design' *in order to develop effective design solutions for the project, there must be positive participation and constructive input from all consultants throughout the project development process*
- ❑ confirm project schedule/deadlines:
  - emphasize importance of meeting deadlines, particularly during documentation
  - consequences of consistent failure to meet deadlines (*significant delay could result in penalties*)
- ❑ review program/budget/client's system preferences (*some clients, such as school boards, may have preferences for specific mechanical systems*)
- ❑ general discussion of design principles
- ❑ discuss/agree whether to recommend that client consider alternative mechanical systems
- ❑ review further site information required:
  - geotechnical investigation
  - topographical survey
  - existing municipal services/utilities
  - existing structures
- ❑ instruct consultants to:
  - review all information received from architect
  - examine site
  - make thorough site audit of existing facilities for renovation projects
  - (*relying on original documents without site verification is not acceptable*)
- ❑ establish dates for subsequent design meetings (to be held on a regular basis (*weekly/ biweekly/monthly*); the number/frequency governed by size/complexity of project)

Design meetings:

[Note: architect chairs and records all meetings: complete and issue minutes to all present within 48 hours and copy all minutes of meetings to client]

- ❑ consider arranging meetings with each consultant separately, scheduled consecutively with some overlap to permit joint discussion of related issues and, later, coordination between consultants: (*logical sequence might be structural/ mechanical/electrical*)

- ❑ review consultants' preliminary concepts: encourage constructive input from each consultant
- ❑ assign topics for preliminary investigation, such as:
  - alternative structural systems
  - mechanical systems:
- ❑ instruct consultant to review/cost alternative systems as required (if architect and consultant agree to recommend a more energy efficient/ sustainable system to client, schedule preliminary meeting to review proposal with client to be attended by architect and consultant)
- ❑ prepare report/analysis for presentation to/ discussion with client
- ❑ review potential coordination issues and estimates of construction cost for work of each discipline
- ❑ monitor each consultant's progress and advise promptly if performance is not satisfactory

Design Development:

- ❑ continue regularly scheduled meetings/ minutes *[Note: architect chairs and records all meetings: complete and issue minutes to all present within 48 hours and copy all minutes of meetings to client]*
- ❑ report all relevant matters arising from design meetings with client:
  - data on specialized systems *(refer to list in "Checklist for the Management of the Architectural Project" (page 7, item 9) Chapter 2.3.1)*
- ❑ review/resolve coordination issues on an going basis
- ❑ instruct structural consultant to:
  - investigate/confirm in writing a review of all applicable codes/regulations
  - update construction cost estimates
  - prepare preliminary/outline specifications
- ❑ instruct mechanical/electrical consultants to:
  - obtain written approval for all service connections from utilities/Authorities Having Jurisdiction
  - investigate/confirm in writing a review of all applicable codes and utility/public regulations
  - review architectural/structural schematic drawings to establish/confirm adequate space provision for all systems
  - prepare written description of design principles for review by architect *and, when appropriate, client*
  - prepare schematic drawings of mechanical rooms showing layout of major equipment
  - indicate proposed locations/dimensions of all built-in components
  - update construction cost estimates
  - prepare estimates of operating costs
  - prepare preliminary/outline specifications
- ❑ monitor each consultant's progress: advise promptly if performance is not satisfactory

Construction Documents:

1. Establish timetable/procedures/deadlines:
(reiterate importance of meeting deadlines/ consequences of consistent failure to do so).

- ❑ confirm documentation standards:
  - electronic distribution and printing protocols
  - layering system
  - sheet size/title block/numbering system *same date on all documents*
  - specification format
- ❑ all parties commit to provide information on schedule
- ❑ progress drawings transmitted electronically weekly from consultants to architect for review:
  - instruct consultants to transmit selected relevant drawings to other consultants for their review *as required*
  - updated outline floor plans transmitted by architect to consultants
  - other relevant drawings transmitted by architect to consultants *as appropriate*

2. Coordination Meetings
(attended by all consultants):
[Note: architect chairs and records all meetings: complete and issue minutes to all present within 48 hours and copy all minutes of meetings to client]
(The frequency of coordination meetings may be reduced by effectiveness of electronic transfer of documents between parties)

- ❑ resolve coordination problems
- ❑ review all changes by each discipline regularly
- ❑ monitor/ensure that most recently updated plans are in use by consultants
- ❑ monitor each consultant's progress: advise promptly if performance is not satisfactory
- ❑ instruct consultants to:
  - submit design calculations, reviewed/ stamped by licensed engineer responsible for each discipline, for project record files/ forwarding to Authorities Having Jurisdiction *as required*

- determine required cash allowances *for inclusion in Division 1 of specifications*
- prepare final specification Sections/ Divisions for each discipline
- submit final documents to architect/other consultants for final coordination review (*recommended **minimum** time: two weeks before bid date)*
- prepare final construction cost estimates
- assist architect in advising client on selection of testing & inspection agencies
- assist architect in evaluation of pre-qualification submissions from interested bidders *as required*

❑ check completed documents for coordination/ accuracy: promptly instruct consultants to make revisions required

❑ instruct consultants to seal and sign their documents

Bidding & Negotiation:

❑ instruct consultants to attend pre-bid meeting/ site tour *as required*

❑ consultants' response to questions from bidders:
- may be received directly from relevant subtrades, *or*
- forwarded from architect
- record all answers to facilitate preparing addenda in a timely manner

❑ conform to specified substitutions policy:
- *(recommended practice is to require all proposed substitutions to be submitted for review prior to bid closing, then included in addenda if approved)*

❑ prepare addenda:
- consultants to forward to architect minimum 48 hours before last date stated in Instructions to Bidders to allow architect time to prepare/issue addenda (*if mechanical/ electrical bids specified for submission through a Bid Depository, submission date will be 2 or 3 days earlier than general contractor bid closing)*

❑ after bid opening instruct consultants to:
- assist in evaluation of subtrade/unit/ alternative prices *as required*
- assist in preparation of separate contracts *as required*
- participate in negotiations *as required*

Contract Administration:

1. Office Functions prior to start of Construction:

❑ following documents received from contractor forwarded to consultants for review/comment:
- construction schedule
- schedule for issuing/reviewing shop drawings/samples
- schedule of values

❑ instruct consultants to:
- assist client with applications for gas/ water/electricity/telephone/other services as required

❑ review architect's expectations regarding:
- protecting/supporting the intent of the contract documents
- substitutions policy *refer to Bidding & Negotiation section above*
- no compromises/negotiations without architect's/client's prior approval

2. Field Review:

❑ clarify site visit procedures:
- required attendance at all site meetings *unless no work under way related to a specific discipline*
- review by appropriate discipline (*not acceptable for mechanical engineer to review/report on electrical work, for example)*
- frequency of visits governed by status of work at the site
- all site instructions recorded in writing and copied to contractor/architect immediately

❑ forward written field review reports to architect/ contractor *(architect will submit to client/ Authorities Having Jurisdiction as required)*

❑ emphasize that deal-making will not be tolerated:
- acceptance of changes/substitutions prohibited without prior review/approval by architect *(such approval should be contemplated only in extraordinary circumstances, after client approval)*

❑ monitor each consultant's performance: advise promptly if not satisfactory

3. Office Functions during Contract Administration:

- ❑ lines of communication: remind consultants that all communications must pass through architect to contractor *and vice versa*
- ❑ all discussions/instructions confirmed in writing
- ❑ all instructions/confirmations issued through/by architect *whenever possible: (only exceptions could be urgent field instructions; these must be recorded in writing/forwarded to architect immediately)*
- ❑ shop drawings/samples processing:
  - *architect may choose to instruct contractor to forward structural/mechanical/electrical shop drawings/samples directly to consultants for greater efficiency*
  - *all transmittals copied to architect to note in shop drawing record*
  - *consultants return reviewed shop drawings through architect*
  - *provides opportunity for final review by architect prior to return to contractor*
  - sign and date samples: retain one/return other to architect for forwarding to contractor to retain on site
- ❑ changes/supplemental instructions:
  - prepare supplemental details/instructions *as required*
  - evaluate quotations for changes in contract sum/time forwarded by architect for review
  - superficial review/routine acceptance of charges/unit prices not acceptable
- ❑ review/follow up on field review reports
- ❑ review/comment on contractor's updated progress schedule *as required*
- ❑ review of monthly draws: evaluate work performed/materials supplied in relation to contractor's progress applications

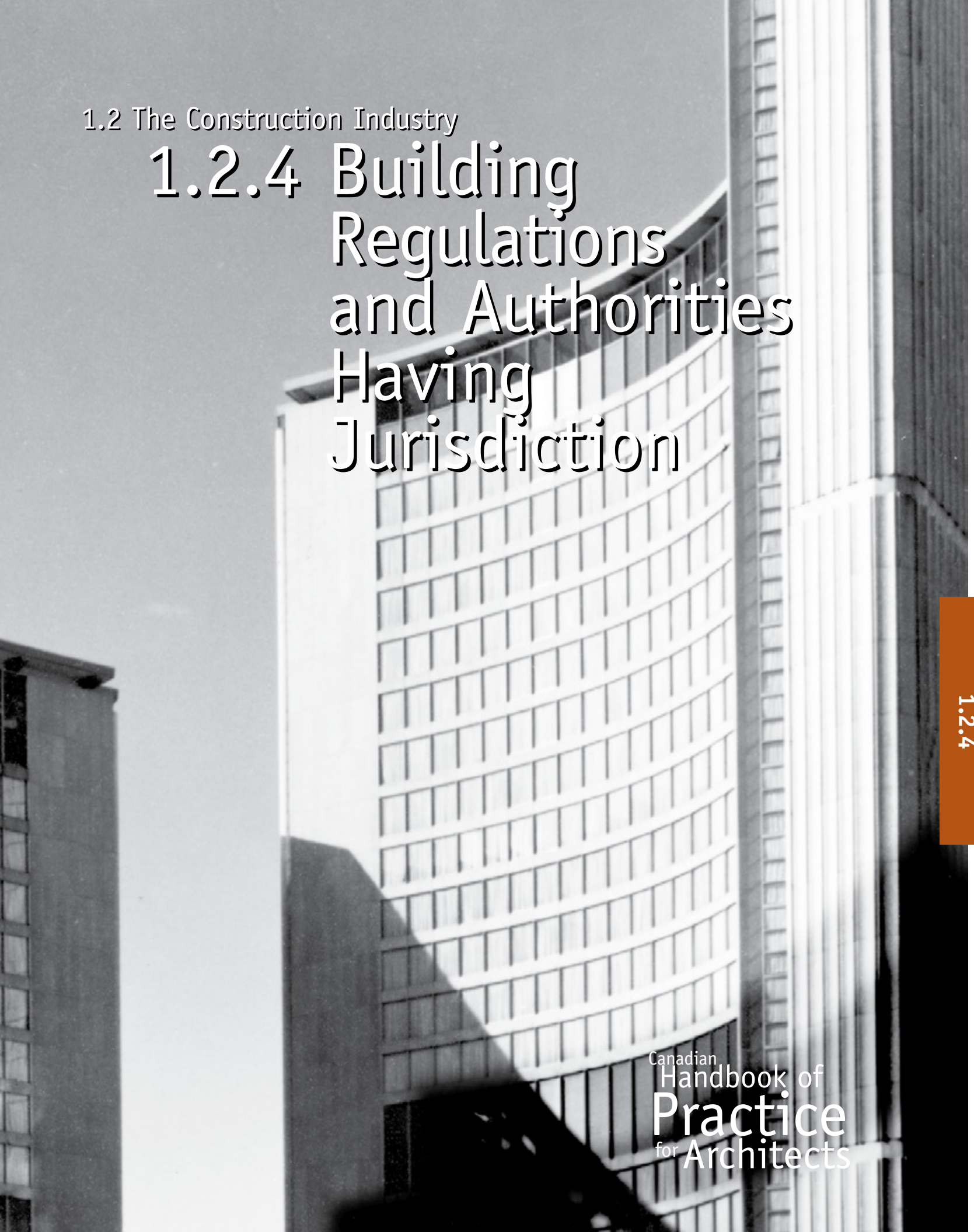
4. Project Take-over:

- ❑ prepare deficiency lists: follow up when contractor reports that deficiencies completed
- ❑ attend equipment demonstrations
- ❑ carry out substantial performance site visit:
  - report findings to architect
- ❑ review relevant submissions, including:
  - warranties
  - inspection certificates
  - manuals
  - operating instructions
- ❑ carry out final site visit
- ❑ update statement of design principles for presentation by architect to Owner
- ❑ provide description of systems
  - how they work, including:
    - zoning
    - sustainability
    - energy consumption
    - maintenance requirements
    - probable life expectancy of components before replacement will be required
- ❑ prepare record drawings *as required*

Post-construction:

- ❑ review reported defects during warranty period
- ❑ carry out review of all reported defects/deficiencies prior to expiry of one-year warranty period
- ❑ assist architect to administer corrective action by contractor where defects/deficiencies occur within extended warranty period(s)

1.2.4 Building Regulations and Authorities Having Jurisdiction



Introduction

The Role of Authorities
- Building Codes and Regulations
- Enabling Legislation
- National Building Codes
- The Building Permit and Inspection Process
- Building Officials

Relationships with Authorities
- The Authority and the Client
- The Authority and the Architect
- The Authority and the Contractor

Approvals

Definitions

References

Appendix — Examples of Typical Approval Processes and documentation from the City of Mississauga

Checklist: Federal Authorities Having Jurisdiction

Checklist: Provincial Authorities Having Jurisdiction

Checklist: Regional and Municipal Authorities Having Jurisdiction

Building Regulations and Authorities Having Jurisdiction

Introduction

The architect's duty to the public is implemented, in part, by interpreting and complying with building regulations. Every project undertaken by an architect is subject to a maze of statutes, codes, standards, and bylaws. It is not uncommon for a project to be regulated by several levels of government (municipal, provincial and/or federal) as well as by First Nations, regional or metropolitan governments.

The numerous government requirements will vary from project to project. A few examples are the regulations governing:

- hospitals, theatres, nursing homes, hotels, and office and industrial buildings;
- toxic and hazardous materials;
- air, noise, and water pollution;
- fire, construction safety, and public health;
- seismic performance;
- accessibility for persons with disabilities.

Refer to the Checklists at the end of this Chapter for more examples.

The architect must have a general understanding of the complete regulatory environment, even though some regulations may not directly affect architectural services or the design process. For example, although construction safety regulations apply strictly to the contractor and to the operation of the construction project, and as such are the responsibility of the contractor, the architect must be aware of these regulations and the accompanying responsibility.

Certain environmental assessment requirements may demand soil or archaeological studies, which could have an impact on the project funding, schedule, and costs. The architect should be familiar with any such regulations, indeed, all regulations pertaining to the project. In addition, the architect should know which Authorities Having Jurisdiction are responsible for the administration of the regulations.

This chapter explains the role of building regulations and their administration by Authorities Having Jurisdiction, and suggests how the architect can work effectively with them.

The Role of Authorities

Building Codes and Regulations

Construction of sound, safe buildings and structures is fundamental. Building codes and regulations provide these minimum safety standards.

Most codes and regulations were established to protect the public, that is, to prevent and mitigate such hazards as structural collapse, fire, accidents, and disease.

Some regulations ensure safe buildings by requiring an adequate supply of potable drinking water, sanitary conveniences, minimum spatial dimensions, and illumination levels, and other features which affect the building design. However, not all regulations govern building safety. A municipal zoning bylaw or land-use regulation, for example, regulates land use and density as well as the bulk, height, and location of buildings. Such a regulation, which is intended to govern the planned and orderly development of the municipality, can markedly affect the architectural design of a building.

Building codes often adopt standards set by public and private organizations. Refer to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*, for more information on standards.

Enabling Legislation

Adopting and enforcing codes and statutes requires federal or provincial legislation. Under the *British North America Act*, and its successor, the *Constitution Act*, responsibility for building regulation rests with the provinces (except for buildings on federal land). Enabling provincial legislation authorizes municipal councils (and others) to appoint staff and assign duties and responsibilities to administer regulations. Sometimes, codes are provincially enacted; sometimes, they are municipal bylaws. The local municipal building official usually administers the building code by means of the building permit and building inspection processes. Building officials are empowered to determine that the erection and maintenance of buildings comply with these regulations.

National Building Codes

The **National Building Code (NBC) of Canada** is a "model" code. The NBC is a code of regulations for public health, fire safety, and structural sufficiency with respect to buildings. It establishes a minimum standard of safety and accessibility for the construction of buildings (including extensions and alterations), the evaluation of buildings involving a change of occupancy, and upgrading of buildings to remove an unacceptable hazard. Serving as a basis for other building codes, the NBC is modified to reflect regional requirements or procedures and then adopted as a provincial or municipal building code.

The **National Fire Code** is also a model code of minimum requirements to ensure an acceptable standard of fire prevention, fire fighting provisions, and life safety in existing buildings and within the community at large. Although life safety is the primary objective of the National Fire Code, it also includes measures of property protection to the extent that they make a direct contribution to life safety and for the purpose of controlling conflagrations or large loss fires.

The **National Plumbing Code** (Part 7 of the NBC) covers the design and installation of plumbing systems in buildings.

The **National Farm Building Code** deals with the particular requirements for farm buildings.

The **National Housing Code** and Illustrated Guide is a compendium of requirements in the National Building Code which apply to detached, semi-detached, and row houses.

The **Model National Energy Code of Canada for Buildings** and the **Model National Energy Code of Canada for Houses** provide standards for the construction of energy-efficient buildings.

These codes are "model" documents only and must be adopted provincially in order to come into effect.

The Canadian Commission on Buildings and Fire Codes (CCBFC) issues the National Building Codes, written by various technical committees and published by the National Research Council of Canada. The NBC has recently introduced "objective-based" requirements to eventually replace the "prescriptive" requirements found in the National Building Code.

The Building Permit and Inspection Process

The client or his/her agent (sometimes the architect) must submit an "application to build" to local building officials, and usually must verify the correctness of the application by a statutory declaration. The application is accompanied by a stipulated number of sets of architectural, structural, mechanical, and electrical documents for the proposed building. Officials review the application for compliance with municipal bylaws, regulations, and the building code. Other municipal bodies — such as fire, planning, health, and public works departments — may also review the application. When the documents are approved, a building permit is issued. The applicant is advised of any non-complying items.

During construction, municipal building officials review the work for general compliance with the approved documents and building codes.

In the case of deviations, revised plans must be submitted to and approved by the building department. Each province has its own system to ensure compliance. For example, Ontario has recently created a Building Code Designation System (BCDS) that requires those who are not architects or engineers to become designated in order to apply for a building permit. Another example is the province of Alberta which engages private sector inspectors.

Building officials are authorized to:

- issue compliance orders;
- stop work until corrections have been made;
- lay charges in the case of serious infractions.

Building officials deal primarily with contractors; however, they are also often in contact with project architects, who must review and confirm that the work generally conforms to the documents forming the basis of a building permit.

Other levels of government may also require the submission of construction documents. These Authorities Having Jurisdiction could include:

- the regional, provincial or federal departments of labour;
- public health departments;
- roads, transportation, and communications authorities;
- the office of the fire marshal.

Building Officials

Building officials:

- require and receive applications to erect, enlarge, alter, demolish or move buildings;
- review plans, specifications, and reports to determine that the proposed work meets all applicable regulations;
- issue a permit to commence construction, when the application is complete and complies with all applicable regulations;
- inspect construction in progress for compliance with the approved documents and applicable regulations;
- report contraventions to the appropriate persons;
- issue orders to correct outstanding contraventions prior to use or occupancy, or sooner where circumstances dictate;
- initiate action according to policy when orders are not carried out within the stipulated time;
- issue a certificate of compliance or a similar document when regulations have been met;
- assess unsafe and inadequately maintained conditions within buildings and order corrective action;
- exercise judgement in the application of regulations;
- keep records as required;
- report regularly to managers and municipal councils;
- review proposals for equivalencies to code requirements.

Building officials must be well-versed in the regulations and their application, and must understand their importance to public safety. They must:

- know the current legislation;
- be aware of changing building technology and its effects;
- have an understanding of what best serves the public interest.

Building officials must also interpret the meaning of the regulations, their current relevancy, and the need for change. To do so, the officials must communicate effectively with:

- the public, to help the public understand regulations and procedures;
- municipal councils;
- design professionals;
- the construction industry;
- associations concerned with public safety in buildings and structures;
- committees and persons who prepare regulations;
- other building officials.

Relationships with Authorities

The client, the architect, consultants, and the contractor may all have to deal with various Authorities Having Jurisdiction.

The Authority and the Client

The client may become directly involved with an authority during the pre-design stages. Experienced clients may also make initial inquiries to the authorities prior to the appointment of an architect, or in conjunction with the architect. The client may apply directly for the building permit.
If a permit is denied, even when all documentation for compliance with zoning bylaws and the building codes is provided, the client should consult the architect. If necessary, legal counsel can be sought.

The following are possible legal procedures affecting the construction of buildings:

- an injunction;
- a mandamus.

An *injunction* is sought when a public body applies to the court for an order restraining a private individual or other body from violating an applicable law. In the construction industry, it is often applied to stop an individual or company from constructing a building contrary to regulations, codes or bylaws. A typical example is a "stop work order."

A *mandamus* is an order directing a public body to exercise a public duty, such as the issuance of a building permit. If a municipality refuses to issue a building permit and forces the client to apply to the court for a *mandamus*, the architect must be sure that all building plans and specifications comply fully with municipal bylaws and building codes.

The Authority and the Architect

For the architect, the most important Authorities Having Jurisdiction are those which administer the zoning and development bylaws and the applicable building code.

Analysis of zoning and code requirements commences early in the design of a project and the architect begins the process of communication with the various Authorities Having Jurisdiction. Together with the sub-consultants, the architect will usually be the prime contact with authorities during the design and contract document stages. Refer to Chapter 2.3.5, *Schematic Design*.

The architect must be thoroughly familiar with the building code. It contains many requirements, in addition to structural ones, which affect the design of the building, such as:

- window openings;
- means of egress;
- design of stairways and their enclosures;
- openings between floors;
- compartmentalization for fire safety;
- accessibility for persons with disabilities;
- travel distance to exits.

Most officials encourage early consultation with architects to clarify zoning bylaws and building code requirements before the construction documents are advanced. In some instances, the local authority requires payment of the permit fee before providing consultation. For major projects, it is advisable to hold a series of meetings with the Authority Having Jurisdiction as the design progresses. Minutes of these meetings should be prepared and distributed. Such consultations will help to encourage cooperation, improve communications, and resolve differences of interpretation with respect to the zoning bylaw or building code. This in turn will help avoid the costly delays that result from revisions to construction documents.

Early consultation with building officials also enables the architect to determine which approvals from other government bodies will be needed to obtain the building permit. As well, the authority becomes familiar with the pending application and should be able to process it more efficiently.

It is good practice for the architect to include a detailed schedule or building code analysis as part of an application for a building permit. This analysis may be part of the construction documents.

Architects are also advised to submit the building permit application — completed and

signed by or on behalf of the client — before or during the call for bids, together with the permit fee. This allows the building department to review the plans and prepare the building permit for the successful bidder before construction contract award. Such a procedure avoids potential delays and allows time to make changes to the plans before the contract is signed. Some owners require the successful contractor to obtain and pay for the building permit, which may result in delays.

The architect should develop professional relationships with building officials and deal with any conflicts in code interpretation tactfully.

Refer also to Chapter 2.3.10, *Contract Administration — Office Functions*, for Letters of Assurance in British Columbia. These documents, required at the building permit and occupancy permit stages, indicate the code-related and other responsibilities of the owners, architects, and engineers.

The Authority and the Contractor

Contact between the Authority Having Jurisdiction and the contractor or Construction Manager normally occurs after the building permit is issued. Without the building permit, the contractor cannot legally begin construction. Permit delays can be extremely costly, as workers and equipment stand idle and contractual obligations are unfulfilled.

In many cases, the contractor is responsible for:

- obtaining a permit from the municipality to occupy public property for the construction of a hoarding or covered way for public protection;
- designing the shoring for excavation or other temporary structures such as scaffolding or guards;
- obtaining separate approvals from the building departments such as a demolition permit or a sewer connection permit.

During construction, the contractor must keep the approved building permit documents on the job site so that the building official can consult them and be satisfied that construction is in general compliance with the approved documents. The contractor must not deviate from these documents without consent of the authority and the architect, and the architect must notify the authorities of any changes. To avoid problems, the architect should review any significant changes with the Authorities Having Jurisdiction, prior to preparing instructions or Change Orders for the contractor.

The contractor or Construction Manager has a responsibility as "constructor" to strictly adhere to the applicable construction safety act and regulations. Provincial legislation governs who is responsible for construction safety. In some instances and in certain jurisdictions, the owner may be the "constructor" and is therefore responsible for construction safety. The situation usually occurs when the owner is performing some of the work directly or has hired more than one contractor. Safety officials inspect construction operations frequently and have the authority to issue compliance or stop work orders in the event of infringements. Refer also to Chapter 1.2.1, *The Construction Industry*.

The architect should be aware that the architect and all employees of the architect are also subject to the construction safety act and regulations.

Approvals

The following authorities are listed in the approximate chronological order in which they may be contacted by the architect.

Planning:

- planning department — for architectural and site control, consultation, and zoning bylaw interpretation;
- committee of adjustment, or planning board, or committee of variance — for minor variances;
- planning board or committee or advisory planning commission — for initial approvals;
- municipal council — for approvals such as the development permit, re-zoning and special agreements;
- provincial municipal board — for contentious council decisions;
- design panel.

Canada Mortgage and Housing Corporation (CMHC): CMHC should be consulted early in the process for multiple-unit residential projects involving CMHC financing.

Roads and Highways:
- provincial highways authority — consult early in the design stage for approval required for projects abutting major highways outside metropolitan areas;

- provincial, county, metropolitan or regional planning and traffic authorities, and roads departments — consult early in the design stage for approval of entrances, exits, grades.

Environment, and Water Resources:
- consult regarding approval if land abuts or includes flood plains, water courses, streams, and low-lying areas or ravines;
- consult regarding approval for both land use and sewage systems for projects which have no municipal sewage available to property, for example, cottages or resort hotels;
- consult regarding environmental impact of previous or proposed use of a site;
- consult if the site has contaminated soils.

Regional Planning:
These bodies, responsible for setting official plans for larger areas, often include a group of smaller municipalities. Although local municipalities may administer site-plan approval, regional planning authority approval may also be required. To minimize confusion, the architect should determine jurisdictional responsibilities at the outset of a project.

Institutional and Other Regulating Bodies:
- hospital commissions and boards;
- housing for special needs and users;
- public health departments;
- provincial education authority;
- other authorities, for specific building types or conditions.

Deed Restrictions and Architectural Approval:
- building limitations placed by the vendor as conditions of sale;
- restrictive covenants registered on title;
- building plan approvals are sometimes instituted by industrial and residential land developers as a further means of controlling the design of buildings. Because negotiations can be very complex, the client should check "agreements to purchase" for any such restrictions, and consult the architect or the vendor;
- certain jurisdictions (such as the National Capital Commission in Ottawa) require approval of the architectural design.

Construction:
- building department — for all building permits;
- provincial authority for occupational health and safety — for commercial and industrial buildings;
- provincial fire marshal — usually for institutions receiving provincial funding and for assembly occupancies;
- municipal fire authority — usually for projects other than single-family housing.

Engineering:
- engineering departments — consult for approval of site services. Design approval may be complicated by the division of certain responsibilities to other levels of government. For example, regions may have control over the design of water services and sanitary sewers, while municipalities control storm sewers;
- municipal plumbing departments — consult for special approvals, for example, industrial waste disposal, restaurant and food preparation wastes, water and service connections, and design of special septic systems;
- works departments — for items affecting streets, easements or other public property.

Definitions

Authority Having Jurisdiction: A body having jurisdiction in certain matters of a public nature; a body having power under a statute to pass regulations to direct, specify, and govern elements or activities of construction projects such as safety, health, or standards of manufacture or installation; a government body responsible for the enforcement of any part of the building code, or the official or agency designated by that body to exercise such function (as per the NBC).

Building Code: A regulation which describes minimum requirements for public health, safety, and welfare for the design and construction of buildings.

Constructor: A person who contracts with an owner or the owner's authorized agent to undertake a project; includes an owner who contracts with more than one person for the work on a project, or undertakes the work on a project or any part thereof (as per the NBC).

Permit: A document issued by an Authority Having Jurisdiction allowing work or an activity which is specified.

Stop Work Order: An order to a constructor by an Authority Having Jurisdiction ordering the work to be stopped.

References

The American Institute of Architects (AIA). *An Architect's Guide to Building Codes & Standards*. Second Edition. Washington, D.C.: AIA Press, 1990.

Canada. National Research Council of Canada. *National Building Code of Canada*. Ottawa, Ont.

Scott, James G. *Architecture Building Codes: A Graphic Reference*.

Yatt, Barry D. *Cracking the Codes: An Architect's Guide to Building Regulations*. Toronto, Ont.: John Wiley & Sons, 1999.

Appendix — Examples of Typical Approval Process and documentation from the City of Mississauga

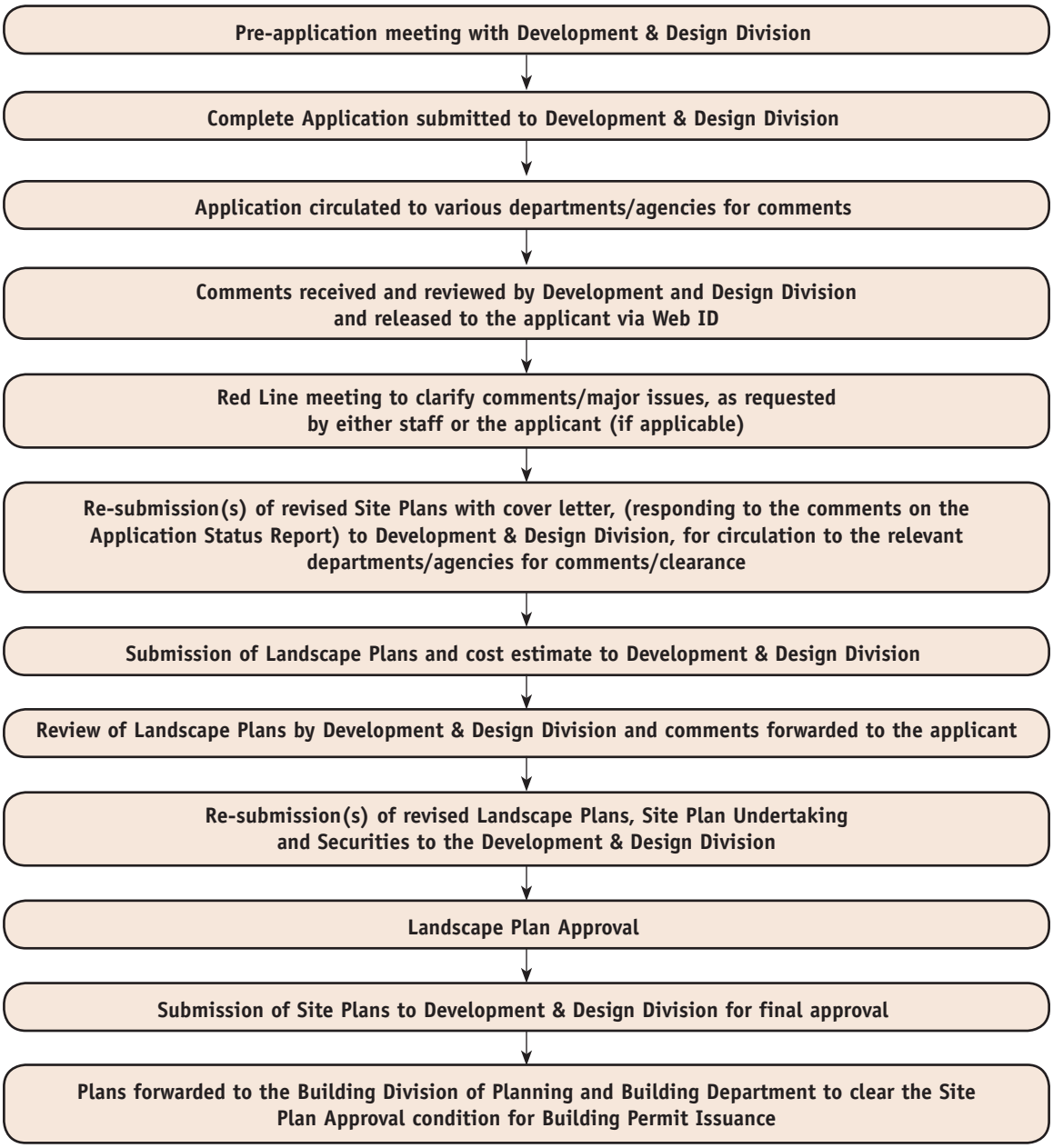
The following table contains all the various forms and documents pertaining to the site plan approval process:

Document	Description
Application for Site Plan Approval	Required for all types of site plan applications. This form includes the Environmental Site Screening Questionnaire and Declaration and the Tree Injury or Destruction Questionnaire and Declaration.
Environmental Site Screening Questionnaire and Declaration	Required for all site plan applications, and identifies the potential for environmental contamination on the subject site.
Tree Injury or Destruction Questionnaire and Declaration	Required to determine if a Tree Permit or Tree Removal Permission is required under By-law 0624-2001 where construction threatens trees that are prescribed in the By-law.
Site Plan Undertaking - Homeowners	Required for all site plan applications to ensure the applicant completes the site works as shown on the approved drawings. The undertaking must be countersigned by the Director of Development and Design.
Site Plan Undertaking - Corporations	Required for all site plan applications to ensure the applicant completes the site works as shown on the approved drawings. The undertaking must be countersigned by the Director of Development and Design.
Letter of Credit	Required when securities are held by the Development and Design Division until the site works have been completed to the satisfaction of the Division. Certified cheques or bank drafts are also acceptable forms of security.
Landscape -Reduction of Letter of Credit	Certificate of Inspection is required for all requests for site inspections,except for hoarding inspections and inspections for new dwellings, replacement housing and additions. The inspection fee must accompany the inspection request. The certificate must be embossed with the OALA seal and signed by the Landscape Architect.
Landscape -Inspection of Final Site Works	Certificate of Inspection is required for all requests for site inspections,except for hoarding inspections and inspections for new dwellings, replacement housing and additions. The inspection fee must accompany the inspection request. The certificate must be embossed with the OALA seal and signed by the Landscape Architect.
Landscape - Estimate of Total Costs	Costs for Site Works are an integral part of the Landscape Plan Approval. Landscape Architects are to submit an Estimate of Total Costs for the project, based on the information contained in the Standard Unit Costs for Site Works chart.
Landscape - Standard Unit Costs for Site Works	Costs for Site Works are an integral part of the Landscape Plan Approval. Landscape Architects are to submit an Estimate of Total Costs for the project, based on the information contained in the Standard Unit Costs for Site Works chart.
Replacement Housing, New Dwellings and Additions Guidelines	Available to assist homeowners and/or their agents to meet the design requirements for these types of site plan projects.

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The followng flow chart describes the Site Plan Approval Process

SITE PLAN PROCESS FLOW CHART
Under the Planning Act, R.S.O. 1990 c.P. 13, as amended



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Checklist: Federal Authorities Having Jurisdiction

The following is a list of the principal federal legislation and regulations.

Aeronautics Act:

The legislation authorizes the federal minister regulating transport to establish height, location, and building-use regulations in the vicinity of airports. It constitutes a zoning regulation and must be registered against the lands.

Canadian Environmental Assessment Act:

This legislation requires assessment and auditing of Crown land and federal property based on a wide range of environmental concerns.

Canada Marine Act:

This act establishes the Port Authorities which administer regulations for construction within a port. The Port Authority issues a permit for construction.

National Fire Code:

The Dominion Fire Commissioner has jurisdiction over all federal buildings constructed on any federal property in Canada, a responsibility similar to the provincial fire marshal and/or the local fire department.

Atomic Energy Control Act:

The federal government is the prime authority for ionizing radiation. Provincial officials authorized as inspectors under the Act may come from various provincial departments.

National Building Code:

The National Building Code is a model code which has no legal status unless adopted by a provincial or municipal authority. However, federal government buildings and other buildings which depend upon Canada Mortgage and Housing Corporation mortgage financing must comply with the code to qualify for financing.

Navigable Waters Protection Act:

This statute requires an approved application before any structure may be built in or over navigable waters.

National Parks Act:

This act and its subsidiary regulations govern buildings within federally owned parks.

Checklist: Provincial Authorities Having Jurisdiction

Each province has its own statutes and codes which, although titled differently, essentially govern the same matters. The following list is representative of areas regulated by legislation in most provinces. The architect should confirm the exact name and responsibility of the Authority Having Jurisdiction in the province.

Boilers and Pressure Vessels:

Although the *Boilers and Pressure Vessels Act* does not usually require permits, equipment must be inspected.

Building Construction:

In most provinces, provincial building codes have superseded all municipal building bylaws regulating construction of new buildings. Despite being provincial statutes, they are administered and enforced by the local municipality. Local building bylaws may apply to all existing buildings and to construction projects involving minor alterations to existing buildings. The provincial building codes may also include a requirement for professional design and field review of specified buildings.

Construction Safety:

Construction safety legislation governs the safety of workers during the construction, demolition or moving of buildings. The legislation stipulates the safety precautions that must be observed during construction and that may indirectly affect the contract documents.

Elevating Devices Construction:

Authorities responsible for elevators, hoists, and lifts provide for their inspection and for licences to operate them. Design and construction should be approved in advance by the appropriate provincial authority.

Environmental Protection:

Environmental authorities administer extensive regulations for the control of air pollution, toxic waste and other environmental requirements, and noise. They are administered by the appropriate provincial authority.

Fire Safety:

The provincial fire marshal and the local fire department have authority to inspect existing buildings, to order repairs and alterations, and to make regulations applicable to new buildings. Many municipalities withhold building permits for schools, hospitals, hotels, and buildings funded by the province, until plans are approved by the fire marshal. Fire safety requirements typically use the National Fire Code as a model.

Fire Safety for Hotels:

The provincial fire marshal may require that hotel plans be approved prior to construction.

Flammable Products:

Various provincial authorities administer regulations for service stations and for the storage and handling of flammable liquids and solids.

Float Homes:

In British Columbia, float homes must comply with provincial regulations.

Highway Improvement and Transportation:

The appropriate provincial authority controls/limits access to properties. Under the regulations, building permits are required to construct buildings or structures within a prescribed distance of a controlled access road. Projects within the specified distance require a municipal building permit, as well as approval from the appropriate provincial authority.

Home Owners Protection:

The provincial authority regulates residential builders and provides requirements for project warranties.

Hospitals:

The provincial hospital authorities require that all hospital plans be approved, which in turn requires approval of the provincial fire marshal. Approval by these two provincial authorities is usually required before the local municipality issues a building permit.

Liquor Licence:

The appropriate provincial authority must issue a licence, and approve the building plans, before an establishment is permitted to sell alcoholic beverages.

Public Health:

The local municipality, through a bylaw, regulates a wide range of public health concerns, including restaurants and food preparation establishments.

Theatres:

The appropriate provincial authority approves plans for all theatres before it issues a building permit.

Water Resources:

Authorities for water resources and conservation govern natural water courses and adjacent plumbing installations.

Workplace and Industrial Safety:

The appropriate provincial authority requires that plans for such buildings as industrial buildings, restaurants, office buildings, and arenas be approved prior to construction.

Checklist: Regional and Municipal Authorities Having Jurisdiction

Regional Government Authorities

In many areas, regional authorities have additional building permit requirements. Regional government authorities may require that the setback from the street line and points of ingress and egress for all buildings located on metropolitan roads be approved. In regional municipalities, the regional health unit must approve installation of septic tanks or similar sewage disposal units.

Municipal Authorities

The following is a partial list of areas regulated by municipal authorities:

Planning:
Development applications and sub-division agreements often require that the local or regional planning authority approves building and site plans before it issues a building permit.

Zoning:
Land use, bulk, height, location, and site density — which can significantly influence the architectural design of a building — are regulated by municipal authorities.

Building:
Municipal bylaws or provincial statutes containing all structural and fire safety requirements for new buildings are administered by the local municipality. Separate permits may be required for heating systems.

Plumbing:
All sanitary and plumbing installations must be in accordance with provincial regulations. The separate permit required for plumbing is usually obtained by the mechanical contractor.

Signs:
Signs and advertising devices require separate permits and must comply with applicable sign bylaws.

Swimming Pools:
Swimming pools and their protective enclosures must comply with municipal bylaws and usually require separate permits.

Public Health:
Building permits for all buildings and structures subject to public health legislation provisions are usually withheld until the plans are approved by the Public Health Authority. Included are food preparation and serving facilities and public swimming pools. Health department approval may also be required for installation of a septic tank or similar private sewage disposal system.

Public Works:
Building permits are normally withheld until the municipal public works departments are satisfied as to the availability of municipal services, and curb and sidewalk protection during construction, provision of drainage system for surface water, deposits for culverts and curb cuts, etc.

Fire Safety:
Many municipalities do not issue building permits until the local fire department has approved plans for compliance with the fire protection requirements of the building code.

Business Licences:
Local municipalities pass bylaws to license and regulate restaurants, public garages, dry-cleaning establishments, laundries, and pool halls. Each bylaw may contain regulations which affect building design or construction.

Electricity:
Electrical inspections are arranged through the local offices of the electrical authority. In addition, industrial safety officers, assistants to the fire marshal, and other inspection personnel look for electrical hazards. When a hazard is located, they may direct that corrective measures be taken to comply with the provincial electrical code, or they may request that the authority conduct a more complete inspection.

The electrical contractor may be required to submit documents to the local electrical power authority to obtain a separate electrical permit.

Municipal or Private Utilities and Services

The architect should check for the requirements of the following services:

- electricity;
- gas;
- sanitary sewer and storm drains;
- telephone;
- water;
- roads and highways;
- railways;
- cable TV.

Private Acts

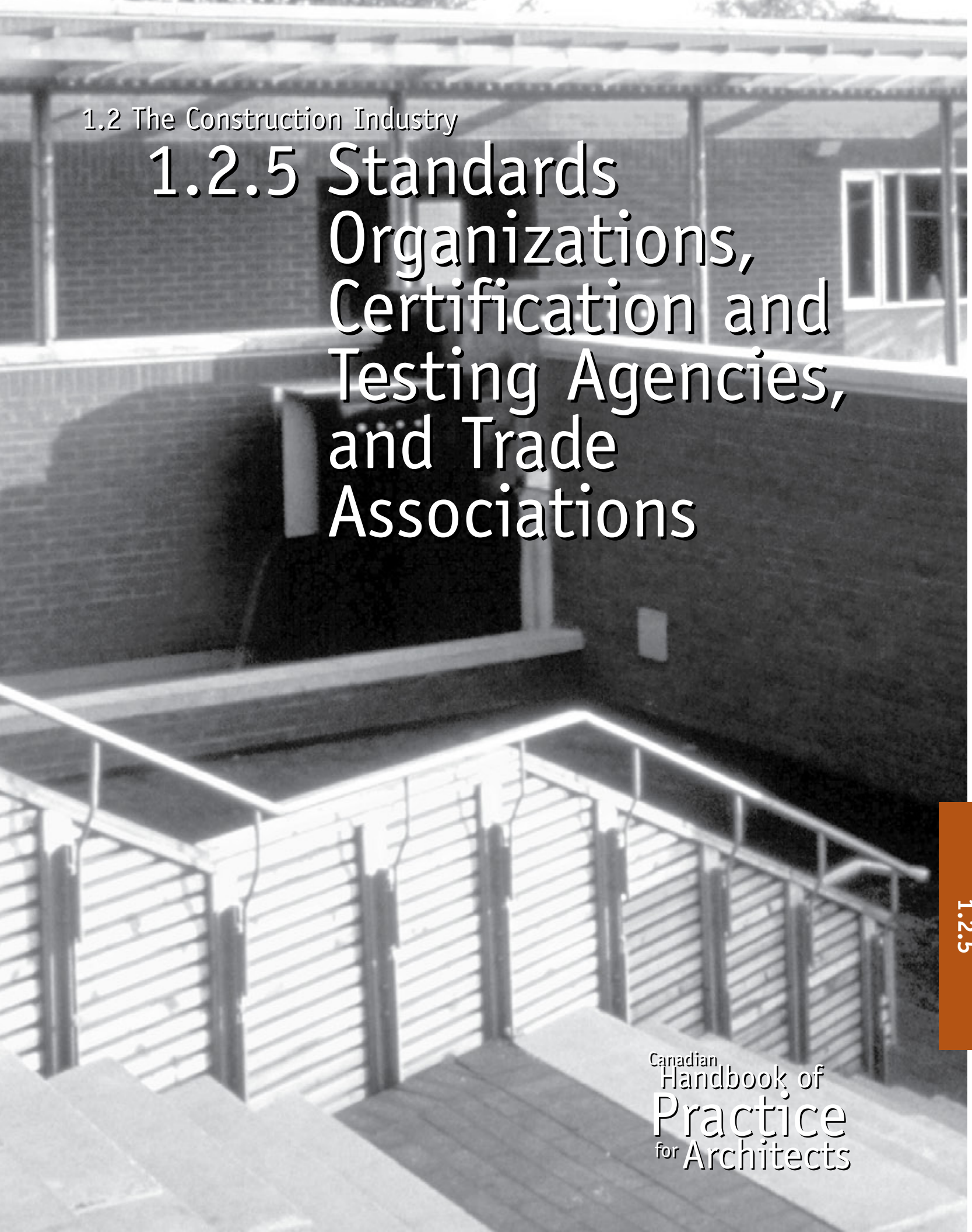
Passed by the legislature, these acts give cities, private individuals or individual municipalities specific power to govern — which may not be applicable to the province as a whole.

For example, the City of Vancouver has a separate charter and sets its own building regulations and codes independently of the rest of the province.

Deed Restrictions

These require a deed check for possible easements, rights of way, air rights for telecommunications, and other similar development constraints or restrictive covenants.

1.2.5 Standards Organizations, Certification and Testing Agencies, and Trade Associations



Introduction

Standards and Standards Organizations
- Canada Green Building Council
- International Organization for Standardization (ISO)
- Canadian Standards Organizations
- Standards Council of Canada (SCC)
- Standards and the Architect

Certification and Testing Agencies

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Definitions

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List: Standards Organizations

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List: Trade Associations

Standards Organizations, Certification and Testing Agencies, and Trade Associations

Introduction

> *Standardization — the development and application of standards — brings people together to pursue better, safer and more efficient methods and products. Standardization is an essential element of technology, innovation and trade.*
> (The Standards Council of Canada)

Like other industries and professions, the construction industry has, over time, developed accepted practices, uniform technical requirements, and agreed-upon terminologies. This has been accomplished through the adoption of **standards**.

Standards are publications prepared by experts, frequently by consensus. Once a standard has been adopted, then manufacturers, suppliers, and **testing** agencies **certify** that a product or material meets the selected standard.

Other procedures and standards are developed and promoted by **trade associations**, which are organizations comprised of members of similar construction trades or manufacturers. Examples of trade associations include the Cement Association of Canada (CAC) and the Architectural Woodwork Manufacturers Association of Canada (AWMAC).

This chapter discusses the role of standards and standards organizations, certification and testing agencies, and trade associations in the construction industry.

Standards and Standards Organizations

Because of the increase in global trade and the requirements of certain trade agreements, Canada is under pressure to "harmonize" its standards with those of its trading partners and with other international standards. Harmonizing standards is difficult because the mandates of the various standards-writing organizations differ. For example, in one nation, the mandate for the development of a certain standard may be restricted to electrical safety, whereas in another country, it may include not only electrical safety but also operator safety, energy efficiency, and other requirements. For this reason, architects must review any changes in updated standards and not assume that the scope, details or minimum level of performance of a standard will be the same as in the previous version.

Canada Green Building Council

The Canada Green Building Council (CAGBC) develops and administers a Canadian version of the popular LEED® (Leadership in Energy and Environmental Design) rating system for buildings. It is affiliated with the US Green Building Council and holds the licence for LEED® in Canada. In addition, the CAGBC certifies buildings based on documentation submitted by the architect or other members of the design and construction team. Credits are provided for the various criteria within LEED rating system and the building can achieve four possible levels of certification (certified, silver, gold and platinum).

Refer also to Chapter 1.2.1, *The Construction Industry* for more information on the Canada Green Building Council and to Chapter 2.3.4, *Pre-design* - Appendix A - *Green Building Rating Systems* for more information on LEED® .

International Organization for Standardization (ISO)

The International Organization for Standardization, or ISO, is a non-governmental federation of national standards bodies from 157 different countries. ISO is the world's largest developer and publisher of International Standards. ISO is a network of the national standards institutes of 157 countries, one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system.

ISO works with member countries to develop standards that will improve operating efficiencies and reduce trade barriers among nations. The results of this work are international agreements, published as International Standards. ISO covers standardization in all fields except electrical and electronic engineering, which is the responsibility of the International Electrotechnical Commission (IEC).

Canadian Standards Organizations

Standards in Canada are written and promoted by many different organizations, including government, industry, trade, public interest groups, and professional organizations.

Funding for the development and maintenance of standards comes from a variety of sources, including:

- industry;
- government;
- membership fees;
- the sale of standards.

Standards Council of Canada (SCC)

The Standards Council of Canada (SCC) is a federal Crown corporation with the mandate to promote efficient and effective standardization. The SCC coordinates and oversees voluntary standards development, promotion, and implementation in Canada through the National Standards System. It also coordinates Canada's participation in international standardization through the IEC and ISO.

The SCC has accredited hundreds of organizations. Some of these develop standards; others are conformity assessment bodies or certification agencies, which determine the compliance of products or services to the requirements of a standard. The list of accredited organizations includes:

- standards development organizations;
- certification agencies;
- testing and calibration laboratories;
- quality management systems (QMS) registration organizations that perform registrations to the ISO 9000 series standards;
- environmental management systems (EMS) registration organizations that perform registrations to the ISO 14000 series standards;
- certifiers and trainers who certify and train QMS and EMS auditors.

Standards and the Architect

Standards developed by non-government organizations in Canada have no force in law unless they are referenced in legislation. Many of the standards encountered by architects are referenced in:

- national building and fire codes;
- provincial building codes;
- occupational health and safety acts.

Even if a standard is not required by legislation, it cannot be ignored. Some standards carry weight in the marketplace because an industry or trade association promotes them and enforces compliance by its members. Other standards ensure that products specified by architects are of a known quality.

Architects must be familiar with current standards when preparing specifications. Refer also to Chapter 2.3.8, *Construction Documents — Specifications*.

Standards cannot be static, because they must respond to:

- changes in industrial processes;
- the introduction of new techniques or materials;
- new safety or environmental priorities.

Feedback about current standards may lead to their withdrawal or revision or to the development of new ones. A standard may be withdrawn because:

- it is no longer needed;
- no one wants to fund its maintenance any longer;
- it is cheaper to adopt a standard developed elsewhere.

Many standards are reviewed on a regular cycle such as every five years. The schedule for updating standards and for revising legislation which references standards (for example, building codes, electrical codes) may bear no relation to one another. As a result, the latest standard is not necessarily the version referenced by regulations or codes.

Refer to the "List: Standards Organizations" at the end of this chapter for various standards writing organizations.

Certification and Testing Agencies

A standard is not useful unless compliance with its requirements can be verified. Certification is the confirmation, usually by an independent organization, that a product or service meets a requirement. Certification of a product, process or system may involve:

- physical examination;
- testing;
- plant examination;
- unannounced follow-up inspections of a manufacturing site or service provider.

This procedure leads to the issuing of a formal assurance or declaration — by means of a seal, label, trademark or certificate — that the product, process or system fully conforms with the requirements of the standard. Certification indicates that a product or system has been evaluated under a formal process and that the product complies with all applicable standards.

In the past, a third party was used to certify and test for conformance to most standards. Recently, there has been a shift from third-party certification to self-certification in order to reduce the costs and the time involved in obtaining certification. Permission to self-certify is only granted after a manufacturer or service provider has implemented quality assurance procedures and submitted to examination and testing by a recognized authority.

Refer to the "List: Certification and Testing Agencies" at the end of this chapter.

Refer also to Chapter 2.1.8, *Quality Management*.

Trade Associations

The construction industry has many trade associations whose purposes include:

- promoting their industry or sector;
- developing good practices and standards for their trade or product;
- conducting research and development within the specific field of the trade associations;
- publishing and distributing information, guides, and manuals to members and others;
- lobbying government and others regarding issues specific to the trade or product.

Although trade associations vary in size and sophistication, many conduct research and prepare standards. The architect should be aware of these standards. The research on products, materials, and procedures can contribute to the design process, and many trade association standards should be referenced in project specifications.

Refer to the "List: Trade Associations" at the end of this chapter.

Definitions

Certification: The verification that a product or procedure meets a specific standard; the certification may be in the form of a certificate, seal or permission to use a trademark from an Authority Having Jurisdiction.

Standard: A publication which describes recognized or approved procedures, practices, technical requirements, and terminologies.

References

The American Institute of Architects (AIA). *An Architect's Guide to Building Codes & Standards.* Second edition. Washington, D.C.: The AIA Press, 1990.

American National Standards Institute (ANSI).
www.ansi.org

American Society for Testing and Materials (ASTM).
www.astm.org

Associations Canada. *Associations Canada: The Directory of Associations in Canada*. Published annually. Toronto, Ont.
www.circ.greyhouse.ca/page/association

Canada. National Research Council of Canada. *Registry of Product Evaluations*. Ottawa, Ont.: Institute for Research in Construction.
www.irc.nrc-cnrc.gc.ca/ccmc/regprodeval_e.html

Canadian Commission on Building and Fire Codes (CCBFC). National Research Council of Canada. *National Building Code of Canada 2005*. Ottawa, Ont.: CCBFC, 2005.
www.nationalcodes.ca/nbc/index_e.shtml

Canadian Standards Association (CSA). *Construction Plus: A Guide to CSA Construction Standards*. Third edition. Toronto, Ont.: CSA, 1993.

National Fire Protection Association (NFPA). Quincy, MA. *NFPA Codes and Standards.*
www.nfpa.org

List: Standards Organizations

International Standardization Organizations

IEC International Electrotechnical Commission
www.iec.org

The International Electrotechnical Commission (IEC) is a global organization that prepares and publishes international standards for all electrical, electronic and related technologies. These serve as a basis for national standardization and as references when drafting international tenders and contracts.

The IEC's work includes standardizing the symbols used on building construction and engineering drawings.

ISO International Organization for Standardization
www.iso.org

Refer also to the section on ISO in this chapter.

Canadian Standardization and Standards-writing Organizations

SCC Standards Council of Canada
www.scc.ca

Refer to the section on the SCC in this chapter.

CNSC Canadian Nuclear Safety Commission
www.cnsc.gc.ca/eng

The Canadian Nuclear Safety Commission (CNSC) protects the health, safety and security of Canadians as well as the environment, and respects Canada's international commitments on the peaceful use of nuclear energy.

CCBFC Canadian Commission on Building and Fire Codes
www.nationalcodes.ca/ccbfc

Under the auspices of the National Research Council, the CCBFC produces the National Building Code (NBC), the National Fire Code (NFC), the Canadian Plumbing Code (CPC), the Canadian Farm Building Code (CFBC), and the Canadian Housing Code (CHC).

CGA Canadian Gas Association
www.cga.ca

CGSB Canadian General Standards Board
www.tpsgc-pwgsc.gc.ca/cgsb/home/index-e.html

The CGSB, a part of Public Works and Government Services Canada, is mandated to provide standardization and conformity assessment services in support of government purchasing and other requirements. The CGSB is the only accredited federal government standards-development body in Canada.

The CGSB's services include:

- maintenance of approximately 1000 standards, specifications, manuals, and guides in both English and French;
- listings of pre-qualified products and services;
- ISO 9001 conformity assessment services;
- accredited ISO 9001 quality system registration services;
- accredited ISO 14001 environmental management systems services.

CSA Canadian Standards Association
www.csa.ca

The Canadian Standards Association is a not-for-profit membership-based association serving business, industry, government and consumers in Canada and the global marketplace.

The CSA develops standards in the following areas of interest to architects:

- **Business/Management Systems**
- **Communications/Information**
- **Construction:** Building Materials and Products; Concrete; Masonry; Forest Products; Plumbing Products and Materials; Industrialized Building Construction; Structures (Design)
- **Electrical and Electronics:** Canadian Electrical Code Part I; Canadian Electrical Code Part II, Wiring Products, Industrial Products, Consumer and Commercial Products; Canadian Electrical Code Part III, Electrical Engineering Standards, Performance of Electrical Products
- **Energy:** Renewable Energy; Energy Conservation in Housing; Fire Safety and Fuel Burning Equipment
- **Environment:** Environmental Technology; Environmental Management Systems
- **Gas Equipment:** Food Processing and Food Refrigeration; Gas-Fired Domestic and Commercial Heating Equipment and Air Conditioning; Large Input Commercial and Industrial Equipment; Domestic and Commercial Water Heaters and Boilers; Incineration and Accessories; Laundry Equipment; Manual Valves, Hose, Couplings, and Assemblies
- **Life Sciences:** Health Care Technology; Public Safety; Occupational Health and Safety
- **Materials Technology:** Welding, Metals, and Metal Products
- **Transportation/Distribution:** Materials Handling and Logistics; Oil and Gas Systems and Materials.

ULC Underwriters' Laboratories of Canada
www.ulc.ca

The ULC develops standards in the following areas of interest to architects:

- Automotive Equipment
- Building Construction Materials
- Burglar Alarm Equipment and Systems
- Factory-Built Fireplaces, Chimneys, and Vents
- Fire Alarm Equipment and Systems
- Fire Extinguishers, Extinguishing Systems, and Fire Extinguishing Media
- Fire Fighting Apparatus and Equipment
- Fire Protection Equipment
- Fittings and Associated Equipment for Flammable Fuels
- Fittings and Associated Equipment for Gases
- Kitchen Exhaust Equipment
- Physical Security Equipment
- Tanks and Associated Equipment
- Thermal Insulation

WHMIS Workplace Hazardous Materials Information System (Health Canada)
www.hc-sc.gc.ca/ewh-semt/occup-travail/whmis-simdut/index-eng.php

The Workplace Hazardous Materials Information System (WHMIS) is Canada's national hazard communication standard. The key elements of the system are cautionary labelling of containers of WHMIS "controlled products", the provision of material safety data sheets (MSDSs) and worker education and training programs.

North American Standardization and Standards-writing Organizations

ANSI American National Standards Institute
www.ansi.org

ANSI — a private, not-for-profit membership organization — is the administrator and coordinator of the U.S. private-sector voluntary standardization system. ANSI does not itself develop American National Standards (ANSs). ANSI has accredited more than 175 distinct entities to develop standards.

ASHRAE American Society of Heating, Refrigerating, and Air Conditioning Engineers
www.ashrae.org

ASHRAE's purpose is to advance the arts and sciences of heating, ventilation, air conditioning,and refrigeration through research, standards writing, continuing education, and publications. ASHRAE writes standards that set uniform methods of testing and rating equipment andestablish accepted practices for the industry worldwide, such as the design of energy-efficientbuildings. ASHRAE's research program investigates numerous issues, such as identifying new refrigerants that are environmentally safe.

ASME American Society of Mechanical Engineers, Inc.
www.asme.org

ASME International maintains and distributes codes and standards for the design, manufacturing, and installation of mechanical devices. The standards are used in more than 90 countries throughout the world. ASME also publishes technical journals, books, and reports on mechanical engineering.

ASTM American Society for Testing and Materials
www.astm.org

Organized in 1898, the ASTM is a not-for-profit organization that publishes standard test methods, specifications, practices, guides, classifications, and terminology. The ASTM's standards development activities encompass metals, paints, plastics, textiles, petroleum, construction, energy, the environment, and many other areas. The ASTM has developed more than 10,000 technical standards, which are published each year in the 72 volumes of the *Annual Book of ASTM Standards*.

AWPA American Wire Producers Association
www.awpa.org

The AWPA is an international trade association for the ferrous wire and wire products industry in North America.

EPA Environmental Protection Agency
www.epa.gov

The EPA is a U.S. government agency mandated to protect human health and to safeguard the natural environment.

NFPA National Fire Protection Agency
www.nfpa.org

The NFPA's technical committees develop more than 300 codes and standards known collectively as the *National Fire Codes*. NFPA codes and standards are available as the 12-volume *National Fire Codes*, as more than 300 individual documents, or on disk.

NFPA periodicals supplement the *Fire Protection Handbook* with current information. *Fire Technology* provides reports on current research in the technical aspects of fire protection. The NFPA established the not-for-profit National Fire Protection Research Foundation to research fire risk assessment as well as new technologies and strategies.

Commonly used NFPA codes and standards include the following:

- National Electrical Code (NFPA 70);
- Life Safety Code (NFPA 101);
- Flammable and Combustible Liquids Code (NFPA 30);
- Standard for the Installation of Sprinkler Systems (NFPA 13);
- Standard for the Storage and Handling of Liquefied Petroleum Gases (NFPA 58);
- Standard for Health Care Facilities (NFPA 99).

NIST National Institute of Standards and Technology
www.nist.gov

NIST is an agency of the U.S. Department of Commerce's Technology Administration and was established to advance measurement science and develop standards.

SMACNA Sheet Metal and Air Conditioning Contractors' National Association
www.smacna.org

SMACNA is an international association of union contractors with chapters throughout the United States, Canada, Australia, Japan, and Brazil. SMACNA develops technical standards and manuals for all facets of the sheet metal industry, including duct construction and installation, air pollution control, energy recovery, and roofing. SMACNA's Technical Resources Department answers technical questions from architects and others.

UL Underwriters Laboratories
www.ul.com

Underwriters Laboratories Inc. (UL) is an independent product safety certification organization that has been testing products and writing Standards for Safety for over a century. UL evaluates products, components, materials and systems.UL's worldwide family of companies and network of service providers includes 62 laboratory, testing and certification facilities serving customers in 99 countries.

List: Certification and Testing Agencies

This is a partial list of various certification and testing agencies in Canada. Some of these organizations also prepare standards.

BNQ	Bureau de normalisation du Québec
CLAS	Calibration Laboratory Assessment Service/NRC
CAEAL	Canadian Association for Environmental Analytical Laboratories Inc.
CAGBC	Canada Green Building Council
CGA	Canadian Gas Association
CLSAB	Canadian Lumber Standards Accreditation Board
CSA	Canadian Standards Association
CWB	Canadian Welding Bureau
COFI	Council of Forest Industries
ITS	Intertek Testing Services
KPMG	KPMG Quality Registrar Inc.
NLGA	National Lumber Grades Authority
QMI	Quality Management Institute, a division of CSA
QUASAR	Quality Systems Assessment Registrar
SGS	SGS International Certification Services Canada Inc.
ULC	Underwriters' Laboratories of Canada
UL	Underwriters Laboratories (U.S.)
WHPS	Warnock Hersey Professional Services

List: Trade Associations

This is a partial list of trade associations organized by the MasterFormat™ divisions with a link to the website. The list includes Canadian and U.S. references. The contact information can also be found through a search on the Internet or in the following sources:

- **National Master Specification (NMS)**
- **Associations Canada — *The Directory of Associations in Canada*.**

Division 3

ACI	American Concrete Institute *www.concrete.org*
ACPA	American Concrete Pavement Association *www.pavement.com*
ACPA	American Concrete Pipe Association *www.concrete-pipe.org*
CAC	Cement Association of Canada *www.cement.ca*
CPCI	Canadian Precast Prestressed Concrete Association *www.cpci.ca*
CRSI	Concrete Reinforcing Steel Institute *www.crsi.org*
NPCA	National Precast Concrete Association *www.precast.org*
PCI	Precast/Prestressed Concrete Institute *www.pci.org*

Division 4

BIA	Brick Industry Association *www.bia.org*
BSI	Building Stone Institute *www.buildingstoneinstitute.org*
CMCA	Canadian Masonry Contractors Association *www.canadamasonrycentre.com*
CBAC	Clay Brick Association of Canada *www.claybrick.ca*
NCMA	National Concrete Masonry Association *www.ncma.org*

Division 5

AA	Aluminum Association *www.aluminum.org*
AWS	American Welding Society *www.aws.org*
AWPA	American Wire Producer's Association *www.awpa.org*
CCBDA	Canadian Copper and Brass Development Association *www.ccbda.org*
CISC	Canadian Institute of Steel Construction *www.cisc-icca.ca*
CSSBI	Canadian Sheet Steel Building Institute *www.cssbi.ca*
NAAMM	National Association of Architectural Metal Manufacturers *www.naamm.org*

Division 6

AHA	American Hardboard Association *www.domensino.com/AHA/*
AITC	American Institute of Timber Construction *www.aitc-glulam.org*
AWI	Architectural Woodworking Institute *www.awinet.org*
AWPA	American Wood-Preservers Association *www.awpa.com*
AWMAC	Architectural Woodwork Manufacturers Association of Canada *www.awmac.com*
CLA	Canadian Lumbermen's Association *www.canadianlumbermen.com*
CPIA	Canadian Plastics Industry Association *www.cpia.ca*
CWC	Canadian Wood Council *www.cwc.ca*
FPS	Forest Product Society *www.forestprod.org*
NHLA	National Hardwood Lumber Association *www.natlhardwood.org*
TPIC	Truss Plate Institute of Canada *www.tpic.ca*

Division 7

AI Asbestos Institute
www.asbestos-institute.ca
CRCA Canadian Roofing Contractors' Association
www.roofingcanada.com
EIMA EIFS Industry Manufacturer's Association
www.eima.com
TIAC Thermal Insulation Association of Canada
www.tiac.ca

Division 8

AAMA American Architectural Manufacturers Association
www.aamanet.org
AGMCA Architectural Glass and Metal Contractors Association
www.agmca.ca
CSDFMA Canadian Steel Door and Frame Manufacturing Association
www.csdma.org
CWDMA Canadian Window and Door Manufacturers Association
www.cwdma.ca
GANA Glass Association of North America
www.glasswebsite.com
NGA National Glass Association
www.glass.org
WDMA Windows & Door Manufacturers Association
www.wdma.com

Division 9

AWCI Association of Wall and Ceiling Industries International
www.awci.org
CCI Canadian Carpet Institute
www.canadiancarpet.org
CPCA Canadian Paint and Coatings Association
www.cdnpaint.org
TCAA Tile Contractors Association of America
www.tcaainc.org
NFCA National Floor Covering Association
www.nfcaonline.ca
TTMAC Terrazzo, Tile and Marble Association of Canada
www.ttmac.com
WACCA Walls and Ceilings Contractors Association
www.wacca.ca

Division 23

AHRI Air Conditioning Heating and Refrigeration Institute
www.ahrinet.org
AMCA Air Movement and Control Association Inc.
www.amca.org
API American Petroleum Institute
www.api.org
CGA Canadian Gas Association
www.cga.ca
HRAI Heating, Refrigerating and Air Conditioning Institute of Canada
www.hrai.ca
MCAC Mechanical Contractors Association of Canada
www.mcac.ca
MSS Manufacturers' Standardization Society of Valve and Fittings Industry
www.unitedvalve.com
SMACNA Sheet Metal and Air Conditioning Contractors National Association
www.smacna.org

Division 26

CECA Canadian Electrical Contractors Association
www.ceca.org
EEMAC Electrical Equipment Manufacturers Association of Canada
EFC Electro-Federation Canada
www.electrofed.com
IEEE Institute of Electrical and Electronics Engineers
www.ieee.ca
NEMA National Electrical Manufacturers Association
www.nema.org

Division 28

CASA Canadian Alarm and Security Association
www.canasa.org

Division 32

ASPT Association of Asphalt Paving Technologists
www.asphalttechnology.org

Division 33

AWWA American Water Works Association
www.awwa.org

Canadian Handbook of Practice for Architects

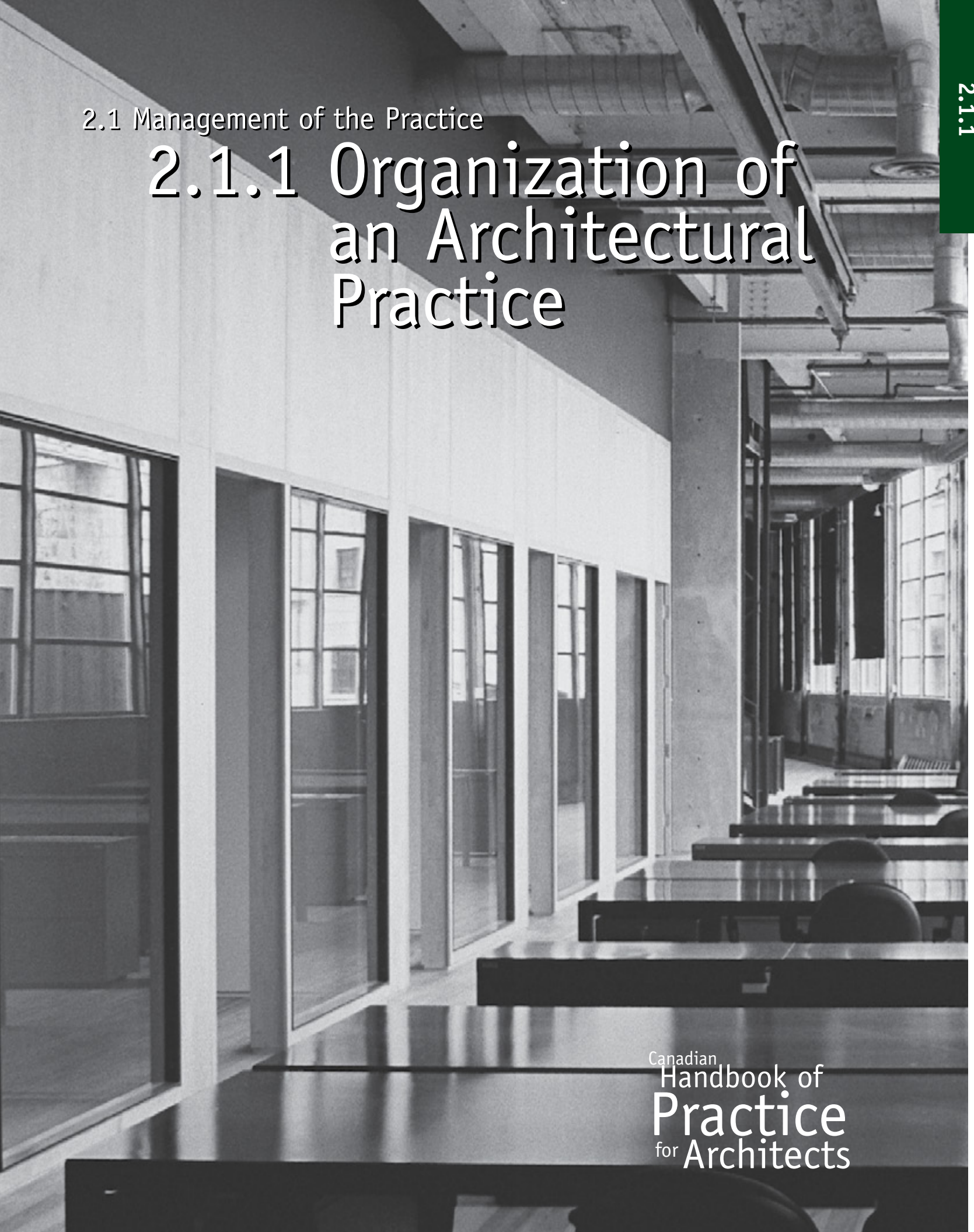


Volume 2

Management

2.1 Management of the Practice
2.2 Sample Forms for the Management of the Practice
2.3 Management of the Project
2.4 Sample Forms for the Management of the Project

2.1.1 Organization of an Architectural Practice



Canadian Handbook of Practice for Architects

2.1.1

Introduction

Strategic Planning
- Styles of Architectural Practices
- Client Base

Types of Ownership of an Architectural Practice
- Agreements
- Sole Proprietorships
- Partnerships
- Corporations
- Partnership of Corporations
- Joint Ventures
- Multi-disciplinary Firms
- Foreign Firms

Internal Structure of an Architectural Practice
- Design Teams or In-house Studios
- Departments or Departments with Project Managers
- Other Combinations

Other Professional Services
- Legal
- Accounting and Tax Planning
- Insurance
- Investment and Retirement Planning

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Checklist: Issues to Consider for Partnership Agreements

Checklist: Issues to Consider for a Shareholders' Agreement for Architectural Corporations

Checklist: Issues to Consider when Preparing a Joint Venture Agreement

Organization of an Architectural Practice

Introduction

Architects decide to set up their own practices for many different reasons. Some of these include:

- the desire to control one's own professional destiny;
- the motivation to provide service to society and to clients;
- the wish to specialize in a certain field of architecture or market niche;
- an offer to form a partnership or purchase shares from an established firm or colleague;
- the award of a significant commission, either through a competition or from a business associate;
- a means for creating work or employment.

Anyone considering such a change should be aware from the outset that establishing an architectural practice has serious implications for one's personal, professional, and business life. The individual should carefully weigh all the implications before embarking on this course.

Establishing and maintaining an architectural practice demands certain skills. One must be able to:

- market one's services and get work;
- negotiate terms and compensation in client-architect agreements;
- hire and manage qualified staff;
- perform the full range of architectural services efficiently and effectively;
- work with the construction industry and administer contracts;
- operate profitably and provide stability to the practice.

The first key steps in launching a practice are to assess one's own abilities, set long-term goals, and develop a strategic plan.

Strategic Planning

A strategic plan is a document that charts a course for the development of an architectural practice in clear, simple terms. It should identify the following:

- the architectural practice's unique offerings in the marketplace;
- a vision for the future of the practice;
- measurable goals or milestones.

Typically, a strategic plan would encompass a time frame of three to ten years and it should be updated continually. The plan should address the following issues:

- the *goals* of the architectural practice;
- a *service* plan for providing architectural services to clients;
- a *financial* plan;
- a *human resources* plan for staff and principals;
- a public relations and *marketing* plan;
- a *succession* plan.

These various topics are discussed elsewhere in this section 2.1, *Management of the Practice*. Strategic plans usually assess:

- strengths;
- weaknesses;
- opportunities;
- threats.

Styles of Architectural Practices

Many organizations develop a mission statement which helps to ensure that all members of the organization focus on the goals established in the strategic plan.

The mission statement should define the style of practice, to a certain extent. Three common generic styles as described by The Coxe Group are:

- *Strong-idea (brains) firms*, which are organized to deliver singular expertise or innovation on unique projects. The project technology of strong-idea firms flexibly accommodates the nature of any assignment, and often depends on one or a few outstanding experts or "stars" to provide the last word;
- *Strong-service (gray-hair) firms*, which are organized to deliver experience and reliability, especially on complex assignments. Their project technology is frequently designed to provide comprehensive services to clients who want to be closely involved in the process;
- *Strong-delivery (procedure) firms*, which are organized to provide highly efficient service on similar or more-routine assignments, often to clients who seek more of a product than a service. The project technology of a delivery firm is designed to repeat previous solutions over and over again with highly reliable technical, cost and schedule compliance."

  -excerpt from the book, *Success Strategies for Design Professionals*, by The Coxe Group, Inc.

Client Base

An architect can attract clients and expand the practice's client base in a number of ways, including:

- specializing in a field of expertise or in a particular building type;
- developing new markets;
- providing pre-design or post-construction services to encompass the life of a facility;
- forming partnerships with non-traditional groups or individuals who are not normally aligned with architects;
- expanding the geographic base of the practice.

Refer to Chapter 2.1.3, *Public Relations and Marketing*, for information on marketing architectural services.

Types of Ownership of an Architectural Practice

Architectural practices are structured according to size and complexity. Frequently a practice will start as a simple entity, such as a sole proprietorship, and evolve into a more complex legal structure, such as a corporation, or partnership of corporations. Several factors affect the type of ownership including relationships with professional colleagues, tax implications, and exposure of personal assets. Architects should seek the advice of a lawyer and accountant before structuring a practice.

Agreements

All business relationships should be based on a written agreement. Business partners should share certain values and financial goals, and architects are no exception. For partners or shareholders, a well-structured agreement provides a vehicle to deal with expansion, difficulties, and disagreements, as well as with disasters. Obtaining professional advice from a lawyer and accountant in preparing an agreement which outlines the ownership of an architectural practice is essential.

The structure of the practice must comply with the various architects acts and regulations of the provincial or territorial associations of architects as well as with other business regulations.

Refer to the "Charts: Comparison of Practice Requirements of Each Provincial Association" in Chapter 1.1.5, *The Organization of the Profession in Canada*.

Sole Proprietorships

A sole proprietor is a single, unincorporated owner of an architectural practice. This architect has full personal control over all aspects of the practice. A sole proprietor can range from someone with a small, home-based office practice to an architect who employs many professionals and para-professionals. Most architectural practices in Canada are sole proprietorships.

Partnerships

A partnership is comprised of two or more partners. Most provincial associations impose restrictions on whom an architect may form a partnership with.

Refer to the "Comparison of Provincial Requirements regarding Partnerships" in Chapter 1.1.5, *The Organization of the Profession in Canada*.

A partnership may include "associates"; however, only the partners bear personal responsibility for the control and liabilities of the practice. Each partner is both jointly and severally liable for the partnership's full obligations. Because a partnership is a complex form of ownership, its terms should be spelled out in a partnership agreement. For items to include in a partnership agreement, refer to "Checklist: Issues to Consider for Partnership Agreements Between Architects" at the end of this chapter.

Corporations

A corporation is a legal, collective entity authorized by statute to act as an individual business unit. Most provincial and territorial associations of architects have regulations which restrict the share ownership and the qualifications of directors of architectural corporations.

In Québec, the Ordre des architectes du Québec (OAQ) is in the process of changing its regulations to permit architects to incorporate. As of 2008, a company cannot practise architecture; only individuals, partnerships or consortia can practise architecture. However, an architect may provide professional services through a company in which he or she is a majority shareholder. Furthermore, an architect cannot practise in any type of arrangement with non-architects such as engineers, urban planners, interior designers. However, these other individuals may be minority shareholders in a company of which one or more architects are majority shareholders.

Refer to the "Comparison of Provincial Requirements regarding the Ownership and Structure of Corporations Which Practise Architecture" in Chapter 1.1.5, *The Organization of the Profession in Canada*.

Incorporating a practice is done for a variety of reasons. The issues should be reviewed with a lawyer and an accountant before forming a corporation and entering into a shareholders' agreement. For items to include in a shareholders' agreement, refer to "Checklist: Issues to Consider for a Shareholders' Agreement for Architectural Corporations" at the end of this chapter.

Partnership of Corporations

A partnership of corporations is an architectural practice structured to preserve the individual identity of two or more corporations. There are a variety of reasons for creating this form of business entity. Such an entity:

- enables individual architects who are incorporated for business or tax reasons to practise with both the advantages of a partnership and the advantages of their corporation;
- allows two or more corporate practices to retain separate identities for certain types of projects but join forces for other types of projects;
- allows the bringing together of complementary but differing interests and ownership -- for example, one corporation may focus on architectural services, while the other is a corporation providing support through drafting services, equipment, real estate and other chattels, etc.

Joint Ventures

Joint ventures are usually formed to create one architectural entity for the purpose of a single specific project. Frequently, a joint venture is set up to provide complementary services for a particular project -- for example, a practice specializing in hospital work may need to team up with a firm located near the site of the project to provide contract administration services, especially field review.

Joint venture projects may require special liability insurance, often on a single project basis, to protect the parties forming the joint venture. Architects contemplating working in

association or in a joint venture should review the circumstances with their professional liability insurers to determine the most appropriate insurance arrangements. Clients may require the participants of a joint venture to obtain single project insurance with higher limits than the practices carry through their annual practice insurance.

Architectural practices should clearly define -- in writing -- their share of the services and fees before entering into a joint venture. Some provincial associations regulate joint ventures and their names.

For items to include in a joint venture agreement, refer to "Checklist: Issues to Consider when Preparing a Joint Venture Agreement" at the end of this chapter.

Multi-Disciplinary Firms

Multi-disciplinary firms are professional companies which include architects and other professionals, usually engineers. Such firms may also include urban planners, landscape architects, interior designers, and other consultants. Any multi-disciplinary firm must comply with the requirements of the provincial associations of architects in order to practise architecture. It can sometimes be beneficial to have all disciplines on a building project readily available in-house. Such an arrangement can simplify communication among, and coordination of, the various disciplines.

Foreign Firms

Certain foreign architectural firms have established branch offices in Canada. The structure of the foreign firm and its ownership must nevertheless comply with the requirements of the provincial association of architects. Several Canadian firms have established branch offices overseas to better serve foreign clients.

Internal Structure of an Architectural Practice

Once a firm is established and grows, it requires an internal structure or mechanism for delivering architectural services. The structure of the practice depends on its leadership and its values and culture, and on the needs of the project.

There are several models:

- design teams or in-house studios
- departments;
- any combination of the above.

Some architectural practices sub-divide the office into teams to deal with a project in its entirety; others compartmentalize the firm, permitting each department to specialize in one type or stage of architectural services.

Design Team or In-house Studio

A design team is usually assembled for a specific project, drawing on the skills of personnel in the office. The team leader, typically a project architect, coordinates and manages the team and deals with the client, sometimes together with the "principal in charge." Occasionally, some architectural practices establish studios which remain together as efficient working teams for an indefinite period of time.

Departments, or Departments with Project Managers

Some larger architectural practices sub-divide staff into groups or departments. Usually each department is responsible for a different phase of the project, such as:

- marketing;
- design and design development;
- construction documents;
- contract administration.

A project architect or senior employee (often called a project manager) is responsible for ensuring proper coordination when the project passes from one department to the next.

Other Combinations

It is possible to create various combinations of design teams, permanent studios and departments.

Other Professional Services

Several professional services are required to support an architectural practice. These include:

- legal;
- accounting and tax planning;
- insurance.

Legal

Establishing a professional relationship with a lawyer is important for the architect. Legal services may be required for the following:

- establishing a partnership or corporation;
- preparing annual minutes for the corporation;
- entering a lease or purchasing office property;
- preparing certain employment agreements with staff;
- reviewing professional liability insurance options and claims;
- reviewing non-standard client-architect agreements or amendments to standard agreements;
- reviewing non-standard owner-contractor agreements or amendments to standard agreements (on behalf of the client);
- assisting in the collection of accounts which are in dispute;
- handling other disputes or legal issues (such as filing and processing liens and mortgages; human resources problems).

It may be necessary to establish a relationship with a number of different lawyers who have expertise in specific fields of practice; or, alternatively, with a larger firm of lawyers that has a range of in-house expertise.

Accounting and Tax Planning

It is also important to establish a relationship with an accountant. Accounting services may be required for the following:

- establishing a practice, whether a sole proprietorship, partnership or corporation;
- establishing financial terms of a partnership or shareholders' agreement;
- preparing periodic balance sheets and profit/loss positions;
- preparing annual financial statements;
- preparing personal and corporate income tax returns;
- assisting in the preparation of sales and value-added tax returns;
- assisting a lawyer in the preparation of a corporation's annual minutes;
- analyzing the financial position of the practice;
- providing tax planning advice.

Some larger architectural practices employ a comptroller, usually an accounting professional, who directs and monitors the day-to-day financial operations of the practice. It may still be required to engage an accountant to provide tax planning advice and ongoing advice on the financial position of the firm, as well as annual financial statements and, if required, audited statements.

Refer also to Chapter 2.1.4, *Financial Management,* for other issues to discuss with an accountant and for an overview of the financial operations of an architectural practice.

Insurance

An architectural practice will have a variety of insurance requirements. Some of these include:

- Professional Liability Insurance
  - general coverage
  - special project coverage
  - add-on insurance or "excess" coverage
- Office Premises and Automobiles
  - theft and vandalism
  - accident
  - fire and other damage
  - owned and leased vehicles
- Life and Accident Insurance
  - personal
  - business partners and directors
- Disability Insurance, to cover
  - office overhead
  - loss of business
  - personal income (income protection)
- Medical and Dental
  - extended medical care
  - dental plan
  - vision care
- Workers Compensation(regulated provincially)

To ensure that the practice is properly and adequately covered, consult an experienced insurance agent or an independent risk management advisor.

A few provincial associations of architects have established liaisons with certain insurance underwriters who provide discounted premiums to architects. Professional liability insurance is a specialized type of insurance provided by a limited number of insurance underwriters and also by the Ontario Association of Architects

Plan for Certificate of Practice Holders of the OAA by the Pro Demnity Insurance Company and by the Fonds d'assurance de la responsabilité professionnelle de l'Ordre des architectes du Québec for members of the OAQ.

Refer also to Chapter 1.1.5, *The Organization of the Profession in Canada*, Chart 5B: A Comparison of Provincial and Territorial Requirements regarding Professional Liability Insurance.

Investment and Retirement Planning

Although not unique to the profession, all architects should plan for retirement and therefore seek the advice of a financial investment professional to ensure proper planning for retirement.

Refer also to Chapter 2.1.2, *Succession Planning*, for other considerations related to retirement planning.

Definitions

Corporation: A legal collective entity which acts as an individual business unit requiring a legal instrument to create the entity as a commercial corporation.

Joint Venture: A defined business relationship between two or more architectural practices for a limited purpose or objective, without some of the inherent duties and responsibilities of a partnership.

Partnership: An unincorporated relationship between architects (or other professionals as may be permitted by provincial requirements) for carrying on business in common.

Sole Proprietorship: An architectural practice owned and controlled exclusively by one person.

References

Cramer, James P. *Design + Enterprise: Seeking a new reality in architecture*. Washington, D.C.: The American Institute of Architects Press, 1994.

Cuff, Dana. "Professions and Professional Life." *The Architect's Handbook of Professional Practice*. Washington, D.C.: The American Institute of Architects Press, 1994.

Coxe, Weld, Nina F. Hartung, Hugh Hochberg, Brian J. Lewis, David H. Maister, Robert F. Mattox, Peter A. Piven. *Success Strategies for Design Professionals*. The Coxe Group Inc.,1987

Demkin, Joseph A., executive editor. *The Architect's Handbook of Professional Practice*. The American Institute of Architects. Hoboken, New Jersey: John Wiley & Sons, Inc. 2008.

Kogan, Raymond F., AIA. *Strategic Planning for Design Firms*. United States, 2007

Maister, David H. "*Managing the Professional Service Firm*." New York, New York: Free Press Paperbacks, 1997.

Stasiowski, Frank A. *Strategic Planning: Preparing Your Firm for Success in the Future*. Newton, MA: PSMJ Resources, Inc., 1997.

McGill Business Consulting Group: *Succeeding by Design - A Perspective on Strengthening the Profession of Architecture in Ontario and Canada*, 2003.
www.raic.org/resources_archives/research/succeedingbydesign_e.pdf

Checklist: Issues to Consider for Partnership Agreements

Establishment of the Partnership

- ❑ Identification of Partners
- ❑ Partnership Name and Trademark or Logo
- ❑ Registration of Partnership under Partnerships Registration Acts
- ❑ Right to Use Former Partner's Name(s)
- ❑ Place of Business
- ❑ Description of Architectural Practice

Term and Termination

- ❑ Commencement Date
- ❑ Termination or Dissolution
- ❑ Liquidation or Distribution of Assets
- ❑ Ownership of Clients

Disposition of Partnership Interests

- ❑ Admission of New Partners
- ❑ Retirement, Bankruptcy, Prolonged Illness or Death of Partner
- ❑ Sale of Partnership Interest To Third Party
- ❑ Valuation of Partnership Interest
- ❑ Prohibition of Assignment or Encumbrance of Partnership Interest
- ❑ Expulsion of Partner
- ❑ Grounds for Dissolution of Partnership
- ❑ Purchase Options: On Death, Retirement or Expulsion, or By Successors from Continuing Founders
- ❑ Power Of Attorney
- ❑ Indemnification for Retired Partners or Deceased Estate when Name Used

Accounting

- ❑ Accounting Principles
- ❑ Auditor
- ❑ Fiscal Year and Budget
- ❑ Banking Arrangements
- ❑ Partnership Assets and Personal Assets

Restriction on Partners

- ❑ Restrictions on Use of Partnership Name
- ❑ Liability for Personal Obligations
- ❑ Indemnities of Partners for Prohibited Acts
- ❑ Payments of Separate Debts
- ❑ Devotion of Full Time and Attention to Business
- ❑ Non-Competition
- ❑ Requirements of Partners to enter into Marriage Contracts with Spouses
- ❑ Insurance
- ❑ Maintenance of Good Standing and Architectural Licence

Management of the Partnership

- ❑ Partners' Authorities
- ❑ Appointment of Managing Partner
- ❑ Management Committee
- ❑ Contracting with Third Parties
- ❑ Division of Responsibilities

Capital and Income

- ❑ Contribution of Capital
- ❑ Division of Net Profits
- ❑ Drawing on Partnership Funds
- ❑ Limitation of One Partner's Share in Profits and Losses
- ❑ Inclusion of Salaries and Benefits in Determining Partners' Profits
- ❑ Liability to Account for Outside Income
- ❑ Remuneration for Outside Income

General

- ❑ Mediation and Arbitration
- ❑ Ownership of Copyright and Waiver of Moral Rights
- ❑ Confidentiality and Trade Secrets
- ❑ Further Assurances
- ❑ Loss of Professional Membership of Any Partner
- ❑ Volunteerism

The foregoing is a list of common concerns and clauses in partnerships and partnership agreements. The list is not exhaustive, will vary in individual circumstances, and cannot replace legal advice. Architects should consult their lawyer(s) before negotiating and entering into a partnership or a partnership agreement.

Checklist: Issues to Consider for a Shareholders' Agreement for Architectural Corporations

Construction of the Agreement

Parties to the Agreement

- ❑ Parties Who Are Not Non-residents
- ❑ Requirements of Provincial or Territorial Associations of Architects
- ❑ Number of Shares and Classes of Shares Held by Each Shareholder
- ❑ Shares Free and Clear of Liens and Encumbrances
- ❑ Warranty of the Corporation Regarding Authorized Capital and Issued and Outstanding Securities
- ❑ Unanimous or Non-unanimous Agreement
- ❑ Termination of Prior Shareholders' Agreements
- ❑ Jurisdiction of Incorporation
- ❑ Incorporation of Articles and Bylaws

Rights and Obligations of Shareholders

- ❑ Permitted Outside Activities
- ❑ Employment of Shareholders
- ❑ Protection of Shareholders
- ❑ Management Contracts with Shareholders
- ❑ Maintenance and Good Standing with Provincial or Territorial Associations of Architects

Default

- ❑ Events of Default
- ❑ Procedure on Default
- ❑ Opportunity to Remedy
- ❑ Consequences of Default

Financing

- ❑ Bank Financing and Signing Officers
- ❑ Calls on Shareholders for Additional Financing
- ❑ Guarantees of Debt of the Corporation
- ❑ Use of Surplus and Net Income
- ❑ Dividends
- ❑ Auditors and Bankers of the Corporation
- ❑

Management of the Company

- ❑ Business of the Company
- ❑ Organization and Management of the Company as per Architects Act
- ❑ Composition of the Board of Directors
- ❑ Limitations on Authority of the Board as per Architects Act
- ❑ Matters for which the Shareholders are to be Notified and Addresses for Notices
- ❑ Officers of the Corporation and Term of Office
- ❑ Appointment and Replacement
- ❑ Time to be Devoted by Officers
- ❑ Remuneration of Officers and Directors
- ❑ Proper Books and Records
- ❑ Meetings of the Directors and Shareholders

Issuance of Additional Shares

- ❑ General Procedure
- ❑ Pre-emptive Rights

Term and Termination Options

- ❑ Effective Date
- ❑ On Death of a Party
- ❑ On Sale of Business
- ❑ Upon There Being One Shareholder

Insurance

- ❑ Lives Insured
- ❑ Payment of Premiums
- ❑ Payment of Benefits under Insurance Policy

Valuation Methods

- ❑ Agreed-to Value
- ❑ Book Value
- ❑ Fair Market Value
- ❑ Formula Value
- ❑ Independent Appraisal
- ❑ Timing of Valuation

Sale of Shares

- ❑ Restrictions on the Transfer of Shares
- ❑ Sale of Shares to a Holding Company
- ❑ Guarantee of Principal of Holding Company
- ❑ Rights of First Refusal
- ❑ Permitted Encumbrances
- ❑ Funding a Buyout
- ❑ Shotgun Clause
- ❑ Auction
- ❑ Option to Purchase/Sell
- ❑ Continued Disability of Shareholder
- ❑ Forced Sale
- ❑ Piggyback Clauses
- ❑ Matched Bids
- ❑ Corporate Share Re-purchase
- ❑ Death or Bankruptcy of Shareholder

General Sale Provisions

- ❑ Notice Periods
- ❑ Resignation of Vendor
- ❑ Cash or Promissory Note
- ❑ Security for Unpaid Balance
- ❑ Provisions Regarding the Restrictions on the Corporation and Shareholders Pending Full Payment of the Purchase Price
- ❑ Default of Payment
- ❑ Retiring Allowance or Consultant's Fee
- ❑ Release of Guarantees and Indemnities
- ❑ General Release
- ❑ Repayment of Debts
- ❑ Failure to Complete Closing
- ❑ Non-competition and Non-disclosure
- ❑ Family Law Considerations
- ❑ Deferred Sale
- ❑ Tax Planning

General Contract Provisions

- ❑ Mention of Shareholders' Agreement on Share Certificate
- ❑ Addresses for Delivery of Notices
- ❑ Mediation and Arbitration
- ❑ Further Assurances
- ❑ Time of Essence
- ❑ Entire Agreement and Amendment
- ❑ Applicable Law
- ❑ Severability
- ❑ Effect of Waiver/Non-waiver
- ❑ Ownership of Intellectual Property and Know-how and Waiver of Moral Rights
- ❑ Confidentiality and Trade Secrets
- ❑ Maintenance of Good Standing with Provincial Association of Architects
- ❑ Loss of Professional Membership of any Shareholder

The foregoing is a list of common concerns and clauses in a shareholders' agreement. The list is not exhaustive, will vary in individual circumstances, and cannot replace legal advice. Architects should consult their lawyers before negotiating or entering into a shareholders' agreement.

Checklist: Issues to Consider when Preparing a Joint Venture Agreement

Establishment of Joint Venture

- ❑ Identification of Architectural Practices
- ❑ Joint Venture Name and Trademark or Logo
- ❑ Place of Business
- ❑ Description of Project
- ❑ Not a Partnership

Management of Joint Venture

- ❑ Formation of Committee
- ❑ Committee to Manage
- ❑ Authority of Committee and Joint Venture Participants
- ❑ Appointment of Individuals and Replacements to Committee
- ❑ Appointment of Project Manager
- ❑ Meetings of Committee
- ❑ Votes Required to Authorize Actions
- ❑ Equality of Votes for each Architectural Practice
- ❑ Prior Consent for Fundamental Acts
- ❑ Co-signatures Required for Important Documents

Responsibilities of each Architectural Practice

- ❑
- ❑ Apportionment of Responsibilities
- ❑ Apportionment of Profit and Loss
- ❑ Maintenance of Good Standing and Architectural Licence
- ❑ Joint Consent for Media Releases
- ❑ Capital Contributions
- ❑ Property Contributions

Financial Matters and Ownership of Property

- ❑ Appointment of Accountant
- ❑ Banking Arrangements
- ❑ Fiscal Year
- ❑ Drawing on Joint Venture Funds
- ❑ Accounting Requirements for each Architectural Practice
- ❑ Authority to Endorse Cheques
- ❑ Approval for Expenses
- ❑ Title to Intellectual Property
- ❑ Insurance Requirements
- ❑ Joint Venture Assets and Assets of Architectural Practices

Term and Termination Options

- ❑ Effective Date
- ❑ Duration of Joint Venture
- ❑ Bankruptcy/Insolvency of Architectural Practice
- ❑ Change of Control of Architectural Practice
- ❑ Material default (with/without Cure Period)

Consequences of Termination

- ❑ Joint Venture Liquidation or Dissolution
- ❑ Return of Property to Architectural Practices
- ❑ Disposition of Property
- ❑ Outstanding Balances Due
- ❑ Ownership of Intellectual Property

Other

- ❑ Settlement Resolution and Arbitration
- ❑ Confidentiality and Trade Secrets
- ❑ Copyright
- ❑ Loss of Professional Membership of any Architectural Practice
- ❑ Further Assurances
- ❑ Addresses for Notice
- ❑ No Assignment of Agreement without Consent
- ❑ Time of Essence
- ❑ Entire Agreement and Amendment
- ❑ Governing Law
- ❑ Severability



2.1 Management of the Practice

2.1.2 Succession Planning

2.1.2

Canadian Handbook of Practice for Architects

2.1.2

Introduction

Options for Succession Planning
- Dissolution of the Practice
- Sale of the Practice
- Merger
- Reapportioning of Ownership
- New Partners or Shareholders

The Strategic Human Resources Planning Process
- Phase 1. Strategic Planning
- Phase 2. Development of the Talent Pool
- Phase 3. Selection and Transition
- Phase 4. Continuous Renewal

The Issues
- Contingency Planning
- Review of Shareholder and Partnership Agreements
- Liability for Past Work
- Payment
- Valuation of the Practice
- Goodwill

Definition

References

Checklist: Items for Consideration in a Buy/Sell Agreement

Succession Planning

Introduction

Principals of architectural firms often neglect or avoid thinking about what will happen to their practice after they retire or leave for other reasons. Planning for this transition — commonly called succession planning — is very important. Effective succession planning will:

- enable architects who own a firm to extend their practice beyond the span of their own careers;
- allow young, emerging architects to develop the skills necessary for future leadership;
- permit owners (of architectural firms) to obtain a financial return on their investment of money, energy, and commitment.

Although of concern to all practices, succession planning is especially important for the many architects who practise in sole proprietorships and small firms. They often have few standby resources and, therefore, face the greatest risk of succession failure.

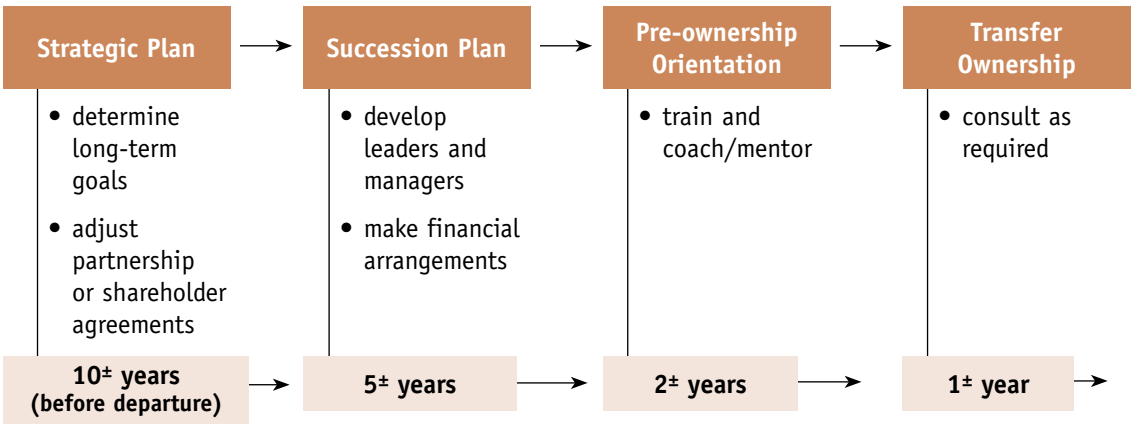
According to management expert Peter Drucker, "the best way to predict the future is to create the future." Effective succession planning requires careful thought and an implementation strategy that can span up to ten years. A good start is to determine one's retirement goals and work backwards to the present. This notion seems elementary, but is complicated to put into practice.

A comprehensive succession plan will:

- set out a transition strategy;
- present a profile of a buyer or buyers capable of taking over the architectural practice;
- establish the financing;
- determine the practice's value;
- deal with tax, legal, and professional liability insurance issues.

Keep in mind the success test for succession planning: Can the departing architect's clients, staff, and legacy be entrusted to the hands of others without any decrease in the firm's level of professionalism and reputation? People may miss the founding architect personally, but they will still be well served if the successors ensure that the firm's professional standards are maintained.

Illustration 1: Timeline for Ownership Transition



Options for Succession Planning

This chapter describes five succession planning options. Each specific practice will have unique characteristics that will result in different chances of success, selling prices or firm valuation, and planning horizons. Actual outcomes will vary according to the size of the firm, and the effectiveness of the strategy and its execution.

Dissolution of the Practice

A disproportionate number of small firms dissolve upon the retirement of the principal architect. Although the dissolution of the practice may seem like a failure of succession planning, this option may be necessary in some situations, for example:

- death;
- illness;
- disability;
- divorce;
- shareholder or partner dispute;
- personal choice;
- bankruptcy.

Contingency planning may reduce the need to resort to this option.

Architects who choose to retire and dissolve the practice should:

- comply with all provincial regulations regarding withdrawal from practice;
- secure a policy for professional liability insurance coverage for retirement years.

Contingency planning under this option should ensure that the practice's drawings and documents are not lost or destroyed, but retained. They can be transferred to:

- another architect;
- an archiving agency such as a university or a provincial or national archive;
- some other acceptable organization;
- a storage facility.

Some provincial associations have regulations requiring retention of an architect's archives. Regardless of whether regulations exist, archives must be retained because of the varying statutes of limitations on an architect's liability (refer to Chapter 2.1.9, *Risk Management and Professional Liability*).

Sale of the Practice

The firm could be sold to an architect or architects outside the practice. It is common practice for the "founders" to be retained by the "successors" as advisors or consultants for a period of time to ensure a smooth transition for both the practice and ongoing projects.

Advantages:
- may sustain the firm's legacy;
- may yield some financial return for the founding architect.

Disadvantages:
- the seller is unlikely to have much influence over the firm's future style or philosophy;
- outside principals will usually pay less for the practice than will inside successors, due to the valuation of goodwill.

Merger

Merging the practice with another architect or firm may be a very good option if the founding architect is one to three years away from retirement and if there are no internal staff available or capable of sustaining the practice. This option is similar to selling the practice in that persons previously external to the firm will have managerial influence over the practice. A significant difference is that the retiring architect may retain greater influence over the future of the composite entity.

However, mergers can fail for a wide variety of reasons, including:

- incompatiblity of corporate culture or style of practice (refer to Chapter 2.1.1, *Organization of an Architectural Practice*);
- incompatibility of software platforms, information technology systems and internal firm structures;
- diversion of resources away from architectural practice as a result of focusing solely on the merger;
- inadequate research or concealment of liabilities by one of the partners;
- redundant staff who are retained resulting in inefficiencies; or conversely,
- reductions to operations or personnel, thereby losing expertise and employee culture. When mergers are unsuccessful, the primary reason is that the two firms do not fit well together. Consequently, the architect

may wish to test the fit before finalizing a formal merger by first entering into a joint venture and/or strategic alliance. Ideally, the new firm will be greater than the sum of the parts, and able to increase its competitive position and market opportunities.

Reapportioning of Ownership

Ownership can be distributed in different proportions to existing partners or shareholders. This option is only available if the firm has other partners and shareholders who are prepared to buy the retiring principal's shares. In these situations:

- if the demand for the shares is high, the seller will usually be able to obtain a higher price under this option than through a sale or merger because internal buyers typically value the acquisition more than do external buyers;
- if all goes well, the sustainability of the practice is high — especially if the existing partners are capable leaders.

New Partners or Shareholders

Inviting new architects or others to become part of an existing practice as partners or shareholders is another option, if the existing partners:

- are close to retirement; or
- want to develop younger talent.

If executed well, this option has a good chance of success. The selling price will also be high, especially if the new shareholders have the cash resources to fund the transfer of ownership. A longer planning horizon is generally required to properly develop people from within the internal talent pool and to give the buyer more time to provide payment for the share transfer.

The following illustration summarizes some of the differences between succession planning options.

Illustration 2: Succession Planning Options

Options	Origin of Successor	Success Probability	Selling Price	Planning Horizon
Dissolve the practice	—	—	—	0-1 year
Sell the practice	external	low	low	1-2 years
Merge the practice with another firm	external & internal	medium	medium	1-3 years
Reapportion ownership among existing partners or shareholders	internal	medium/high	high	1-5 years
Accept new partners or shareholders	internal & external	high	high	3-10 years

External means outside the architectural practice
Internal means within the architectural practice

The Strategic Human Resources Planning Process

Succession planning is most successful when leadership can be transferred gradually within the architectural practice. This process can take up to ten years of internal staff development time and encompasses the following four stages:

Phase 1. Strategic Planning

- know the firm's culture because leadership begins with an understanding of the firm's values;
- develop a strategic plan, which is essential for the firm to effectively integrate business components such as:
  - marketing;
  - production;
  - information technology;
  - finance;
  - human resources;
- realize that the strategic plan will provide a framework for more detailed human resource development.

Phase 2. Development of the Talent Pool

- identify and communicate the measures that future leadership must take to maintain staff commitment and motivate people to achieve success;
- assess existing staff and acquire new talent in areas of deficiency;
- provide opportunities for leadership and cross-functional experience;
- establish a meaningful performance evaluation system to monitor and foster ongoing development through:
  - coaching;
  - review;
  - feedback on performance achievements and performance gaps;
- keep in mind that ownership is not an end in itself, but a way to give a financial incentive to the person identified as a major contributor to the firm;
- implement a continuing education program to nurture the acquisition of professional knowledge.

A common concern regarding staff education programs is that only a limited number of staff groomed for promotion will actually advance within the firm, while others may leave and become informed competitors. While it may seem counterproductive to train potential competitors, remember that: "the only thing worse than training your employees and losing them, is not training them and keeping them" (Zig Ziglar).

Phase 3. Selection and Transition

- select a successor or successors and monitor their ongoing development and performance;
- provide prospective successors with a transition period to management and ownership which involves:
  - management training;
  - leadership development;
  - orientation before taking ownership;
  - professional development to achieve the stature of a senior partner;
  - the introduction of successors to clients and other external business contacts.

Phase 4. Continuous Renewal

- relentlessly continue the process;
- watch for opportunities to use the experience and succession plans of the other owners (if any) to regularly facilitate a staged ownership transition upon successive retirements.

It is healthy to continue with professional involvement after ownership transition/retirement through such activities as mentoring, community service, and committee work.

The Issues

Architects must consider a variety of specific issues during the succession planning process.

Contingency Planning

Such planning is important because it:

- allows for faster succession in case of unforeseen circumstances such as illness, disability, divorce or shareholder/partnership disputes;
- minimizes risk of failure by making the succession plan more flexible, and by building the talent pool.

Review of Shareholder and Partnership Agreements

When reviewing agreements, sellers should:

- seek professional accounting advice and legal counsel when drafting or amending shareholder/partnership agreements;
- ensure that agreements have a termination clause which addresses misfits or poor performers or those with a mental or physical incapacity;
- conduct a detailed regular review of the agreements with new/prospective owners to ensure the ongoing appropriateness and relevance of the agreements.

Liability for Past Work

Generally, the liability for past work stays with the practice, although some insurers or provincial jurisdictions may hold the original principal responsible. Thus, it is important to:

- verify whether individual protection against potential long-term liability exposure after succession should be maintained;
- seek professional counsel for guidance within a specific context and legal jurisdiction.

Payment

Keep in mind that:

- many prospective internal buyers may have a high personal debt load;
- buyers may encounter difficulties providing payment for the acquisition of shares during the succession period;
- it is a significant advantage for the practice to be highly profitable during this period, especially if buyers expect to finance the purchase from the practice's earnings through increased salaries or bonuses;
- the buy-in must be feasible and attractive to new principals;
- a "sinking fund" could assist the second-generation owners to buy-in and pay-out the first-generation "founders."

Valuation of the Practice

The value of the practice may be estimated through:

- earnings capitalization;
- discounted net cash flow;
- excess assets;
- goodwill;
- a modified book value procedure that recognizes the economic worth of the firm (the net realizable value, or NRV) as opposed to an historic assessment based upon generally accepted accounting principles. In most cases, the firm's accounting records are an objective starting point to begin the process of determining the NRV.

Sellers and purchasers should seek independent professional advice when estimating the value of the practice.

Goodwill

Goodwill is a subjective asset. Keep in mind that:

- intangible assets are difficult to evaluate;
- goodwill is often over-valued by the seller because of emotional considerations and under-valued by the buyers due to self-interest;
- the valuation gap between buyers and sellers is even more pronounced when the buyer is from outside the architectural practice;
- the valuation of specific intangible factors "should be restricted to those assets whose utility can be transferred to other parties independent of the business and therefore have some hope of a value in exchange. Even for these, hard evidence should be available to justify the basis of valuation." (Skinner)

Definition

Goodwill: The intangible element of the value of a business (including the worth of the architect's legacy, image, and client base) calculated as the amount by which the value for sale or investment exceeds the sum of net identifiable assets. This is sometimes measured as the current value of expected future earnings in excess of the return required for sale or investment, or calculated as a multiple of earnings performance averaged over a period of five or more previous years.

References

Barlow, Kenneth J. *Internal Transfer of Ownership: A practical guide for consulting professionals*. Clarkson, Ont.: Clarkson Publishing Ltd., 1986.

Kogan, Raymond F., AIA. *Strategic Planning for Design Firms*. United States, 2007

Royal Architectural Institute of Canada (RAIC). *Firm Valuation*. RAIC Practice Builder. Ottawa, Ont.: RAIC.

Skinner, Ross. *Accounting Standards in Evolution*. Toronto, Ont.: Holt, Rinehart and Winston of Canada, 1987.

Stasiowski, Frank A. *The Complete Guide to Ownership Transition*. Newton, MA: PSMJ Resources, Inc., 1996.

Stratem Consultants, Inc. *Succession Planning Within Consulting Engineering Firms*. Ottawa, Ont.: Association of Consulting Engineers of Canada, 1996.

Checklist: Items for Consideration in a Buy/Sell Agreement

Identification of Business and Payment

- ❑ Assets — Land and Leases Inventory, Work In Progress (WIP), Supplies & Equipment, Goodwill, Contracts & Royalties, Accounts Receivable
- ❑ Liabilities
- ❑ Purchase Price, Deposit, Payment of Balance — Cash, Shares, Earn-out Security for Payment
- ❑ Terms of Letter of Intent

Securities and Other Regulations

- ❑ Securities Act Compliance and Exemptions
- ❑ Change of Control of Ownership
- ❑ Investment Canada — Exemption, Notification or Reviewable Transaction (for foreign purchasers)
- ❑ Bulk Sales Act Requirements
- ❑ Provincial Architects Acts

Pre-Closing Matters

- ❑ Insurance and Good Faith Operation of Business until Closing
- ❑ Preview and Seek Required Consents (e.g., from landlord, etc.)
- ❑ Right to Conduct Due Diligence
- ❑ Documents to be Delivered on Closing
- ❑ Independent Legal Advice
- ❑ Other Condition Precedents to Closing

Tax Issues

- ❑ Allocation of Purchase Price
- ❑ GST or HST and Tax Rollovers
- ❑ Tax Filing on Deemed Year End
- ❑ Non-Resident Vendors Tax Certificate
- ❑ Land Transfer Tax
- ❑ Loss Carry Forwards and other Tax History
- ❑ Retail Sales Tax

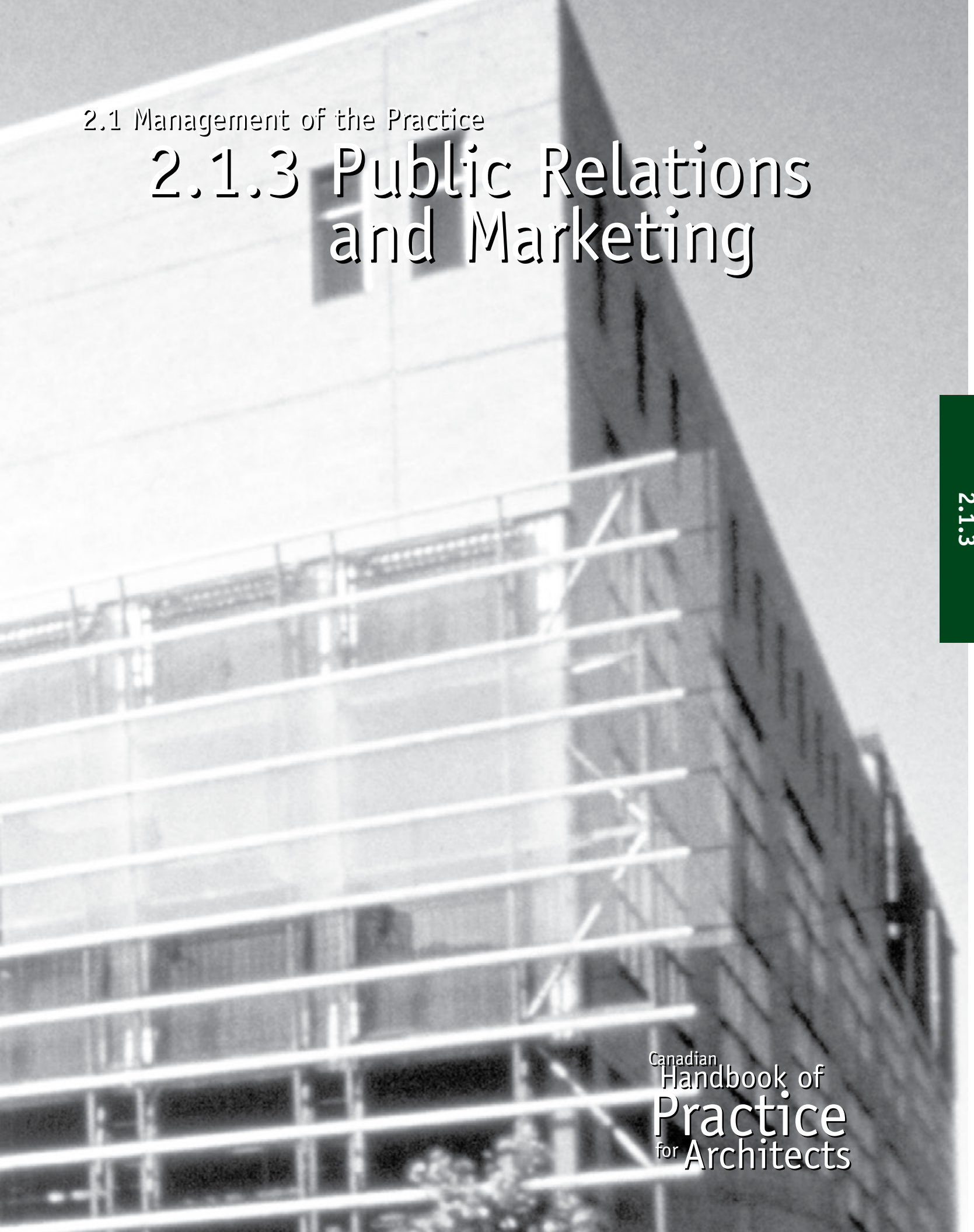
Representations and Warranties of Vendor and Due Diligence of Purchaser

- ❑ Employment and Consultant Agreements
- ❑ Employment Standards
- ❑ Employee Benefit and Pension Plans
- ❑ Environmental Matters
- ❑ Threatened or Pending Litigation or Outstanding Judgements
- ❑ No Other Purchase Agreements Outstanding
- ❑ Contractual and Regulatory Approvals
- ❑ Incorporating and/or Partnership Documents and Licences
- ❑ Compliance with Incorporating and/or Partnership Documents
- ❑ Financial Statements
- ❑ Partnership or Shareholder Agreement
- ❑ Indebtedness
- ❑ Commitments for Capital Expenditures
- ❑ Tax and Source Deductions and Remittances
- ❑ Restrictions on Doing Business
- ❑ Clients and Outstanding Agreements
- ❑ Good Standing of Agreements
- ❑ Affiliations and Joint Ventures
- ❑ Insurance
- ❑ Government Assistance
- ❑ Liens, Charges, and Title to Assets
- ❑ Construction Liens affecting the Practice
- ❑ Real and Intellectual Property
- ❑ Leases of Equipment
- ❑ Condition of Property and Equipment
- ❑ Status of Vendor, i.e., Bankruptcy, Citizenship, Arms Length

Post-Closing Matters

- ❑ Non-Competition — Continuing Employment
- ❑ Confidentiality
- ❑ Employees — Restructuring Employment
- ❑ Release by Vendor
- ❑ Announcements
- ❑ Releases from Guarantees
- ❑ Indemnities and Set Off of Obligations
- ❑ Other Obligations Continuing After Closing

The foregoing is a list of common concerns and clauses in agreements for the sale of a practice. The list is not exhaustive, will vary in individual circumstances, and cannot replace legal advice. Architects should consult a lawyer before negotiating or entering into such an agreement.



2.1 Management of the Practice

2.1.3 Public Relations and Marketing

Canadian Handbook of Practice for Architects

2.1.3

Introduction

Public Relations

Marketing

Marketing: Two Points of View
- The Architect's Perspective
- The Client's Perspective

Professional Relationships

Promotion
- Building Market Awareness or a "Brand"
- Reinforce Interest
- Generate Client Commitment
- Supporte the Commission

Promotional Material and Proposals

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Public Relations and Marketing

Introduction

> *Marketing and public relations are an integral part of every architect's practice. Firms of every size and type must devote some level of attention to securing commissions and bringing their work before the public.*
> (Cooper and Moore)

As the above quotation points out, today's architectural practice must develop a public relations and marketing strategy to succeed and flourish.

Public relations for architects involves communicating the value of architecture and of their architectural practice to a wide range of audiences. Public relations is directed to the community at large, whereas **marketing** usually focuses on specific projects and clients. A coordinated and integrated strategy is a necessary part of promoting and growing a successful architectural practice and acquiring new projects.

This chapter briefly discusses public relations and marketing within an architectural practice.

Public Relations

Public relations is a series of activities which provide opportunities for the architect to become known in the community. Good public relations sets the stage for successful marketing.

These activities may include:

- community involvement, such as:
  - giving lectures and speaking in public on architectural topics;
  - conducting seminars;
  - sitting on volunteer boards;
  - joining service clubs;
  - providing "pro bono" architectural services to community organizations;
  - conducting design charrettes;
  - sponsoring community events;
- good media relations, such as:
  - issuing news releases;
  - contributing to architectural blogs;
  - publishing technical papers, or articles in journals;
  - participating in trade shows;
  - undertaking professional criticism of architectural projects;
  - entering design competitions;
  - preparing and distributing newsletters for the practice;
  - promoting design or architectural awards.

Architects should strive to better inform the public about the value of design and architecture and architects. Public awareness about the value of architectural services can open new markets for the architectural practice and helps to create a receptive environment for the architect in future marketing activities.

Marketing

Many architects contend that "marketing" should be a significant element of the "Strategic Plan" of all architectural practices. (Refer to Chapter 2.1.1, *Organization of an Architectural Practice*, for a brief discussion of a strategic plan.) Marketing activities can vary widely based on the size of the practice; however, all firms should establish an appropriate annual budget for marketing. Marketing is not merely overhead; there is a correlation between a firm's profit and growth and the amount spent on marketing.

Some people distinguish between "marketing" and "selling." In an architectural context, marketing includes everything related to business development, including the planning and administration of all marketing activities, as well as obtaining new clients and ensuring the delivery of high standards of architectural services for repeat business. Selling essentially

means identifying who requires architectural services and securing the commission. Marketing should engage the architect in the never-ending pursuit of client satisfaction. It compels every architect to search out new ways for efficiently meeting, or exceeding, client expectations. The architect must learn to be "client" oriented rather than "production" or "design" oriented. Refer also to Chapter 1.2.2, *The Client*.

Marketing as a *process* involves identifying potential clients. Marketing must be part of the practice's strategic plan and an effective marketing strategy sub-divides "market demand" into manageable segments. Each segment is made up of a group of potential clients who share common needs, attitudes, and behaviours that are different from other market segments. By bringing these similarities and differences into clearer view, it is easier to identify:

- who to pursue for future projects and architectural services;
- what to include and highlight in presentation material;
- potential risks and rewards from each market segment.

Refer also to the "GO NO-GO Checklist to Assess the Degree of Risk" in Chapter 2.1.9, *Risk Management and Professional Liability*.

The marketing terms and concepts of "client satisfaction," "value creation," and "market segment" require that marketing be integrated into the daily operations of the architect's practice. It is useful to track the "proposal closing rate," that is, to identify the number of successful commissions compared to the number of proposals prepared. The "proposal closing rate" can be compared with various marketing activities to determine which methods work best for the practice. Ongoing marketing as a part of the daily routine of all principals will help control the type, amount, and pace of the practice's work.

Marketing: Two Points of View

In developing a marketing plan, all activities must be viewed from two different perspectives:

- the perspective of the architect or architectural practice;
- the perspective of the actual or potential client.

The Architect's Perspective

To develop a marketing strategy, the architect must answer the following questions:

- What types of client and project does the practice want?
  - individual, corporate or institutional?
  - what type of reputation?
  - what size of construction budget?
  - what type of building?
  - what values regarding design and project management?

- What service does the practice want to provide for these clients?
  - what are the firm's strengths?
  - what are the firm's interests and aspirations?
  - what are the firm's capabilities?

- How does the practice want to provide these services?
  - geographically?
  - with what resources?
  - technologically?

- Why does the practice want to do this?
  - to meet lifestyle goals?
  - to meet career goals?
  - for financial reasons?
  - to satisfy architectural goals?
  - to satisfy ideological or altruistic beliefs?

- How will the work be carried out?
  - composition of design team?
  - financial arrangements?
  - operational arrangements?

- What are the risks involved?
  - with this particular client?
  - for the services offered?
  - for the fees charged?
  - in the place of the work?
  - for marketing and promotion to win the project?
  -

The Client's Perspective

Marketing should be considered from the client's point of view. Other partners or associates in the practice can help to develop and analyze this perspective. Client satisfaction surveys can also help in this process.

The strategic plan should help to identify the following:

- the market segments that are of interest to the practice;
- the prevalent needs, wants, and behaviours among prospective clients in these segments;
- the future of this market segment.

It is helpful to ask questions about competitors to determine the competitive position of the practice:

- Within each market segment, who are the main providers of architectural services?
- What is their share of the market?
- What is the basis for their competitive advantage?
  - personal relationship?
  - fees?
  - specialized architectural services?
  - reputation for quality/leading-edge design?
  - promotion?
  - location?
- Can your practice make an offer that is unique and compelling to prospective clients given the other choices available to them?
- What drew former clients to this practice?

Once some of the elements of a marketing plan have been determined, potential clients or "leads" need to be identified. Some techniques for identifying "leads" include:

- compiling names of the potential clients or purchasers of architectural services in each of the preferred market segments;
- developing a list of organizations and the person(s) responsible for decisions related to architectural services, and for the selection of the architect;
- monitor relevant articles from the media;
- organizing business development meetings;
- networking;
- surveying past clients;
- researching Web sites;
- consulting MERX or other similar websites hosting project opportunities.

MERX is an electronic project information service mainly for public-sector contracts. Federal, provincial, and territorial governments — as well as certain institutions in the "MASH" sector (municipalities, academic institutions, school boards, and hospitals) — use MERX for posting project opportunities and bids in Canada. The Web site for MERX is *www.merx.com*

The best source for both new business and new business leads is from existing or former clients.

Once leads have been identified, these prospects should be qualified by determining:

- their current and potential demand for architectural services;
- the main criteria they will use to select an architect.

A wide range of "contact" software is available. This type of software tracks leads and potential clients as well as the frequency and type of contact (for example, telephone call, letter, luncheon date).

The practice should situate each lead in the appropriate stage of the relationship-building process and plan the details of subsequent marketing and promotion. An action plan can then be prepared for each lead or prospect.

After an initial contact, the practice should evaluate the response from each lead and adjust the action plan based on:

- the prospect's reputation and potential as a client;
- the likelihood of the project proceeding;
- the architectural practices from which the prospect will solicit proposals;
- the likely value of the commission;
- the risks attached to winning the commission;
- the cost of pursuing the prospect further.

In pursuing the lead, the architect should remember that a prospective client may actually include several people:

- those who influence the decision-makers — "influencers" in marketing jargon;

- the decision-makers themselves — "buyers" in marketing jargon.

Professional Relationships

If one function of marketing is to create value and client satisfaction, the best form for achieving these is through a long-term, contractual relationship. True value will emerge from the provision of consistent, committed, efficient, and high-quality service over time.

Service in this context is not limited to design: architects are often asked to fulfil a number of roles such as facilitator, efficiency expert, construction cost control, mediator, and problem-solver. Building professional relationships, or "relationship marketing," should be a major part of a marketing plan. A professional relationship is started when a prospective client attaches an image to an architect's name.

Promotion can play a role in developing a relationship. Usually, a professional relationship begins when a prospective client is about to select a consultant. Although the initial contact may not result in a commission, the architect should take advantage of the situation and start to build a solid long-term relationship with this prospective client.

Promotion

Promotion is providing information, motivation, and direction to those individuals who will decide on the timing and terms of selection of an architect. Promotion leads the architect to prospective clients and provides the opportunity to propose a potential offer for services, instead of leaving the opportunity to chance, circumstance or the competition.

The success of effective promotion, like effective design, is based on the efficiency with which the promotion brings about the desired response. Effective promotion brings the right message at the right time to the right audience using the right medium. Promotion must be a proactive activity that aligns with the strategic and business plan of the practice. There are various phases in promotion, such as:

Build Market Awareness or a "Brand"

The marketplace needs to know about the architectural practice. Often this is achieved by developing and then constantly reinforcing a "brand" for the architectural practice.

A brand is the combination of attributes and symbols (such as name, logo, slogans, symbols and designs) that convey the essence of the architectural practice and its services. Brand recognition is directly relating to marketing design, media commentary and public recognition. An important objective in developing a brand is to create a relationship of trust.

The architect should promote the practice and its service, and disseminate the following information:

- the name of the practice and all contact information;
- what distinguishes the practice from the competition;
- the services available;
- the preferred building type(s);
- business, architectural, and financial credentials;
- the reasonableness of fees in relation to the quality of service;
- the performance record;
- the skills and availability of principals and staff;
- evidence for substantiating all such claims.

The objective at this stage of promotion is to motivate potential clients to want to learn more about the architect, and to tell them how to get more information about the practice.

Some techniques for building market awareness include:

- corporate stationery and business cards;
- directory listings;
- articles, such as those published:
  - by members of the firm;
  - about the firm and its work;
- lectures and speeches;
- exhibits;
- sponsorships;
- membership in community organizations;
- philanthropy;

- volunteerism;
- original research and surveys;
- websites which:
  - create a presence on the Internet and a convenient method for displaying images of built work and designs;
  - provide clients and project team members with access to information about a specific project;
  - provide useful information to the public about the built environment.

Reinforce Interest

"Awareness-building" should result in prospective clients wanting to learn more about the kinds of services the architect can provide. In reinforcing the interest of a potential client, communications should progress from supplying general to more specific information on how the practice can fulfil the client's needs. This may involve responding to formal Requests for Proposals.

To reinforce interest, the firm can use:

- brochures;
- Web pages;
- slide presentations, videos, and computer presentations;
- display boards;
- exhibits;
- letters of introduction;
- postcards or greeting cards;
- direct mail;
- newsletters.

Generate Client Commitment

If the prospective client's interest is met or surpassed, the prospective or potential client should perceive that a "fit" is possible. It is critical at this stage to "know" your client. The challenge then becomes to discuss, and then negotiate, the various terms of an agreement. The prospect may be conducting similar negotiations with other architects at this stage.

In order to generate client commitment, consider:

- one-on-one interviews and presentations;
- portfolios (including targeted portfolios);
- photographs and videos;
- customized computer presentations;
- models of previous projects;
- proposals.

Support the Commission

Once the contract has been executed, the architect should take steps to ensure that the new client understands how much the architect values the commission. Just what action should be taken to develop and maintain a professional relationship depends on the architect, the client, and the value of the contract. This relationship should be sustained even beyond the completion of the project through the following methods:

- announcements or news releases;
- advertisements;
- special events;
- newsletters;
- greeting cards.

Promotion Materials and Proposals

Promotional material should be gathered during the course of a project. As projects are completed, every architectural practice should establish standard procedures to document information needed for presentation material or firm brochures. Refer to Chapter 2.3.1, *Management of the Project*, for details on assembling material as part of the office routine at project closeout.

In preparing promotional brochures or proposals, the architect must:

- **always provide the proper credit** for all projects (to avoid misrepresentation, describe the role of the architect in each project accurately);
- **notify references** that their names will be used and request permission for their use (if the response is enthusiastic, request a letter of reference which can be used in promotional material and brochures; however, if the client is reluctant it may be prudent to avoid using the reference).

Refer also to Chapter 2.1.6, *Communications*.

When preparing proposals, the architect should ensure that the fee, if requested by the prospective client, will be adequate to provide the appropriate services. Refer to Chapter 2.1.9, *Risk Management and Professional Liability*.

Competitions

A few architects establish their reputations through architectural competitions.

Guidelines for the conduct of competitions can be found on the RAIC website at: *www.raic.org/architecture_architects/architectural_competitions/index_e.htm*

Architectural competitions for buildings must be endorsed or approved by the Council of the provincial or territorial association of architects and/or the Royal Architectural Institute of Canada. Open and limited competitions for buildings require endorsement as most provincial associations of architects prevent their members from participating in competitions that have not been approved by their Councils.

Endorsed competitions require the engagement of an architect as a professional advisor, who is responsible for:

- advising the owner or sponsor;
- preparing the conditions of the competition;
- making arrangements for the competition.

International competitions for architectural projects may be conducted under conditions unique to the country holding the competition. The International Union of Architects (UIA) has also prepared guidelines for conducting international architectural competitions in its publication, *Instructions and recommendations to promoters of international competitions in architecture and town planning*.

Architectural competitions can be a high risk activity for any architectural practice and therefore each practice must evaluate the effort and return on investment for participating in an architectural competition.

References

Cooper, David and Barry M. Moore. *Marketing and Public Relations*. Washington, D.C.: The American Institute of Architects Press, 1988.

International Union of Architects (UIA). *Instructions and recommendations to promoters of international competitions in architecture and town planning*. Paris, France: UIA, 1978.

Linton, Harold, Laura Clary, and Steven Rost. *Marketing for Architects and Designers*. New York, N.Y. : W.W. Norton and Company Inc., 2005.

Pickar, Roger l. *Marketing for Design Firms in the 1990s*. Washington, D.C.: The American Institute of Architects Press, 1991.

PSMJ Resources, Inc. *Marketing Tactics*. A monthly journal. Newton, MA.

Royal Architectural Institute of Canada (RAIC). *RAIC Practice Builders*. Ottawa, Ont.

An Intense Look at Decision Makers.

60 Winning Proposal and Presentation Tips.

Strategic Planning = Market Share.

Tips for Successful Marketing.

Building with Media.

Shenson, Howard L. and Jerry Wilson. *138 Quick Ideas to get more Clients*. Toronto, Ont.: John Wiley & Sons, Inc., 1993.

Stone, David A.

Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives, Inc., 1999.



2.1 Management of the Practice

2.1.4 Financial Management

2.1.4

Canadian Handbook of Practice for Architects

2.1.4

Introduction

Profit

Financial Planning

Accounting
- Accounting Systems

Financial Professionals
- Accountants
- Bankers

Information for Financial Management
- Fee Calculation
- Project Cost Control Information
- Time Reports
- Cash Flow Forecast
- Invoicing

Other Financial Management Issues
- Compensation
- Tax Planning

Definitions

References

Annual Budget Calculation Sheet

Office Overhead: Includes expenses for rent and utilities, office supplies, computer maintenance, automobile expenses, promotion and advertising, books and subscriptions, annual dues, leasing expenses (except as noted below), postage, delivery services, bank charges, interest charges, business taxes, donations, seminar and training expenses, and depreciation. [Note: consultant expenses, which are required to provide architectural services, are excluded from overhead. However, other consultants such as legal, accounting, and marketing are included in overhead expenses. The purchase or lease of major expenditure items such as automobiles, computers or office renovations are charged as office overhead only to the extent that such expenses can be depreciated in accordance with tax regulations.]

Payroll Burden: Includes required contributions by the employer (statutory benefits), including Employment Insurance (EI), Canada Pension Plan/Québec Pension Plan (CPP/QPP), health taxes, and workers compensation in addition to discretionary benefits such as insurance and pension plans, and bonuses.

Payroll Records: A record of salaries, taxes due and paid, and payroll burden for each employee.

Profit: An excess of revenue over expenses.

Project Cost Control Chart: A financial record of each project, which includes professional fees, consultants' fees, staff time expended, budgeted time, expended payroll, and profit and loss for each phase of the work.

Staff Utilization Records: Identifies monthly and year-to-date hours spent by each staff person on direct labour for projects, as well as hours for vacation, holiday time, sick leave, and miscellaneous overhead duties. The record should indicate a percentage of direct (billable) to indirect (non-billable) time. These records are used to develop billing rates for individual staff members, as well as for short- and long-term planning.

Statement of Income and Expenses: A report, often prepared monthly, documenting all income, all expenses, and the resulting profit or loss.

Tax Records: Includes personal income taxes, corporate taxes, and GST or HST.

Work-in-Progress (WIP): Work underway or complete but not yet invoiced.

References

Dauderis, Henry. *Basic Accounting*. Toronto, Ont.: Holt, Rinehart and Winston, Inc., 1978.

Getz, Lowell.

Financial Management for the Design Professional. New York, NY: Whitney Library of Design, 1984.

An Architect's Guide to Financial Management. Washington, D.C.: The American Institute of Architects Press, 1997.

Stasiowski, Frank A. FAIA. *Dollars & Sense — PSMJ's Guide to Financial Management*. Newton, MA: PSMJ Resources, Inc., 1997.

Stone, David A.

Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives, Inc., 1999.

Financial Management

Introduction

This chapter will provide a short introduction to financial management, an essential activity for every architectural practice. Good financial management systems will help the practice reach its strategic objectives as well as financial goals.

Profit

The practice of architecture is a business and must produce a profit. Appropriate financial planning should always include a reasonable profit, and it is advisable to set aside a percentage of the profit as a capital reserve. Proper tax planning will affect the amount of profit withdrawn from the practice and this amount may be distributed to owners or shareholders (if the practice is incorporated). After a percentage of the profit is set aside as a capital reserve, the balance may be distributed to shareholders (if the practice is incorporated) and to staff. In "lean" years, the capital reserve may be very little or non-existent; however, in "very profitable" years, the capital reserve could be as much as 50% of the practice's profit.

A profit is required in order to:

- build a reserve for cyclical downturns;
- purchase assets;
- pay out retiring or dismissed employees;
- build a successful financial history for borrowing funds;
- invest in research and professional development;
- to fund bonus programs;
- reward owners for efforts expended and risks taken.

Distribution of bonuses to staff should be based on the practice's established policy and on factors determined in a performance review, such as:

- ability;
- productivity;
- professional growth.

Refer to Chapter 2.1.7, *Human Resources*, for information on performance reviews.

When the practice is owned by shareholders or partners who have invested capital in the practice, their investment should earn interest at the bank's prime rate of interest, plus an additional percentage which represents a reasonable return for their financial risk.

Financial Planning

Financial planning should be a part of the strategic plan of every architectural practice. It is the basis for managing an architectural practice, and should include:

- strategic goals and objectives of the practice;
- revenue projections;
- goals for profit;
- budgets for overhead expenses, including any new capital expenditures;
- staffing plans, including number and type of staff.

This financial plan should identify income and expenses projected for any new direction for the practice, for example, the delivery of new services and associated costs required to:

- hire staff;
- undertake research and marketing;
- buy or lease new premises;
- finance professional development and training;
- purchase or lease new furnishings, equipment, and software.

If the practice must downsize as a result of an economic downturn or for another reason, a financial plan is necessary to resolve issues, such as:

- relief from a lease for office space;
- the need to lay off staff (refer also to Chapter 2.1.7, *Human Resources*).

Short-term financial planning, usually called **budgeting**, covers a time period of 12 months primarily because of the requirements for annual financial statements and the normal fiscal year. Budgets show projected income and expenses.

The budget — including all income, expenses, and profit — should be constantly monitored, usually on a monthly basis. The budget should also record the previous year's revenue and expenses, as well as the difference between the budgeted and actual revenue and expenses.

Projected income includes:

- work-in-progress;
- anticipated professional income (based on the previous year's records);
- other anticipated income.

Projected income must be adjusted to account for the current and projected economy in the construction industry and any extraordinary conditions.

Projected expenses include:

- estimated expenses (based on the previous year's records);
- changes in expenses which have occurred or will occur (such as staff pay raises or rent increases);
- increased expenses to meet long-range planning targets, for example:
  - increased staff requirements;
  - increased office space or other overhead expenses.

Profits are usually estimated as a percentage of projected revenues and should be identified in relation to the long-range financial plan.

An architect can use the "Annual Budget Calculation Sheet" at the end of this chapter to help prepare an annual budget.

Both budgeting and long-range financial planning should include appropriate salaries — commensurate with ability and experience — for principals, directors and shareholders.

Accounting

Accounting provides information useful for making financial and economic decisions. There are two types of accounting:

- internal accounting;
- external accounting.

Internal accounting, sometimes called management accounting, is done within the architectural practice — often by staff, a bookkeeper, or other professional such as a comptroller.

External accounting, usually performed by an independent accountant, frequently includes the preparation and examination of financial statements in order to express an opinion on the financial position of the practice.

An audit is an independent and objective examination of accounting records and other necessary documentation in order to express an opinion on the fairness of a balance sheet and other financial statements.

Accounting Systems

Records of accounting are statutory requirements. The better and more accurate the records, the greater the opportunity for more accurate long-range planning and budgeting and, in turn, the greater the opportunity for profit. There are two different systems of accounting:

- cash system;
- accrual system.

Cash System

The **cash system** records each "cash" transaction as it occurs, using two types of entries:

- income or receipts;
- expenses or payments.

Entries begin with the bank balance, and they are made in three columns as they occur:

- deposits or income (first column);
- payments or cheques issued (second column);

- the running balance (third column).

[Note: a negative balance is identified with brackets or with a minus (-) sign.]

Although the cash system shows the actual cash position at any given moment, it is of little value for financial statements and does not provide any information related to profit and loss.

Accrual System

The **accrual system** records all income — including work-in-progress — and expenses as they occur in the general ledger. It shows the current financial position of the architectural practice, usually on a monthly basis.

Using the accrual system, two types of financial reports are prepared:

- statement of income and expenses;
- balance sheet.

Statement of Income and Expenses

A **statement of income and expenses** provides:

- a summary of income, including work-in-progress;
- expenses incurred against all income, including work-in-progress;
- an accounting of profit or loss for the time period.

Most accounting software will provide this information at regular periods.

The statement has three principal components:

- income;
- expenses;
- profit.

Income includes:

- professional fees invoiced [Note: fees for consultants should be retained and may be put into a separate account until due and payable];
- work-in-progress [Note: if all accounts are invoiced monthly, reporting of work-in-progress is not necessary];
- reimbursable expenses invoiced;
- interest income;
- miscellaneous income.

Income recording can also be sub-divided to identify income from separate offices or separate areas of practice, or by individual projects.

Expenses include:

- salaries [Note: this can be sub-divided into categories such as principals (partners or directors), professionals, technical staff, support staff];
- payroll burden;
- consultants' fees;
- overhead expenses, sub-divided by category.

Refer to Illustration 1 for a typical "Statement of Income and Expenses" for a medium-sized architectural practice. This statement would be prepared after all financial records for the fiscal year had been completed. The left-hand column reflects a **history** of the practice's financial activities. The right-hand column illustrates a budget or **future** financial activities based on anticipated revenue and expenses. The increased revenues may be predicted as a result of recently acquired projects or a buoyant economic environment. Similarly, an increase is projected for wages and benefits as more staff will be required to undertake the increased workload. Other costs are projected to increase proportionately as a result of increased staff and work.

Balance Sheet

Usually an accountant will prepare annual financial statements, including a **balance sheet** and a 12-month statement of income and expenses using the following architect-supplied information:

- the general ledger;
- payroll records;
- statements of income and expenses;
- other information.

Balance sheets are important for the monitoring of profit margins and loan commitments as well as for financial planning. The balance sheet indicates the assets and equity position of the practice as well as all liabilities including debts. A balance sheet, and a 12-month statement of income and expenses, are sometimes required by:

- banks, for a line of credit or a loan;
- professional liability insurers;
- governments, for taxation purposes;
- other architects, when restructuring the ownership of the practice or selling the practice.

Illustration 1: Sample Statement of Income and Expenses

Revenue	Previous Year	Budget for Current Year
Professional fees	$890,000	$1,060,000
Reimbursable expenses	90,000	106,000
Interest revenue	1,000	0
Other income	0	0
TOTAL	**981,000**	**1,166,000**
Expenses		
Wages and benefits	$390,000	$466,000
Consulting fees	70,000	85,000
Management fees	70,000	90,000
Printing and reproduction	14,000	17,000
General office supplies	30,000	42,000
Rent	26,000	26,000
Temporary employment services	8,000	6,000
Insurance	28,000	33,000
Travel	20,000	22,000
Automobile expenses	25,000	25,000
Depreciation and amortization	24,000	22,000
Bad debts	26,000	20,000
Bank charges and interest	8,000	9,000
Legal and accounting fees	6,500	7,000
Telephone and facsimile	7,500	8,000
Delivery and postage charges	9,000	8,000
Photography	4,000	4,000
Architectural supplies	6,500	8,000
Business taxes	7,500	7,500
Memberships and dues	4,000	4,500
TOTAL	**784,000**	**910,000**
Revenue less expenses	**$197,000**	**$256,000**

Financial Professionals

Accountants

An accountant is a licensed professional who adheres to certain professional standards and the use of established accounting principles. An accountant should respond to the needs of the practice by advising on the type and extent of financial services required for the size and complexity of the practice.

The accountant's task will be easier, resulting in lower fees for accounting services, if the architect practises good financial management and keeps proper books of account, including:

- general ledger;
- accounts payable;
- accounts receivable;
- payroll records.

Accountants should be familiar with most software programs and be able to provide advice on the software suitable to the size and complexity of the practice. Generally, all payroll software should be for use in Canada.

When engaging an accountant, as with all professionals, it is necessary to establish a clear understanding of the following:

- the services to be provided;
- the "deliverables" or financial reports;
- the professional fee.

The architect involved in the financial aspects of the practice should develop a rapport with the accountant. Nevertheless, it is good practice to request proposals from other accounting firms every three to five years. Proposals from firms of various sizes — and from certified general accountants or certified management accountants, in addition to chartered accountants — should be considered.

Bankers

It is also important to establish a professional relationship with a banker. Proper long-range financial planning and the establishment of a capital reserve should eventually enable the architect to avoid having to finance day-to-day operations. When funds for the operation of the practice are not required, it is possible to "tender" for the bank service fees by asking two or more banks to quote on the charges for various banking services. Instead of acquiring a short-term loan to finance operating expenses, many businesses negotiate a line of credit which can be used when and as required up to a limit arranged with the bank.

The best time to negotiate for a line of credit is when financing is not required. In this case, the cost is usually reasonable in the form of a low standby fee, and the line of credit will be in place when it is required. The interest rate quoted will probably be determined by the bank's perception of the level of risk in financing the architectural practice. The interest rate charged by the bank will be expressed as the percentage over the "bank rate" or "prime rate." (The prime rate is the fluctuating rate which banks charge their best customers.)

When the practice does need to borrow funds, the architect should provide complete records of past performance, plus detailed budgets and long-range financial plans. This information assists the banker in deciding on a line of credit for the practice. The amount of credit is usually a percentage of the accounts receivable and work-in-progress. If the amount requested is high, the bank may demand a higher percentage rate of interest over "prime" on the loan, and usually requires personal guarantees from principals, directors or major shareholders.

A well-prepared cash flow projection (see Illustration 3) for the year ahead may be necessary to successfully negotiate a line of credit with the bank. An accountant can provide advice on the information required by banks for approving loans and a line of credit.

Information for Financial Management

Accurate and complete financial information can assist the architect in preparing accurate budgets, and in monitoring and controlling expenses incurred in providing architectural services. Various forms for financial management purposes are provided in Chapter 2.2, *Sample Forms for the Management of the Practice*, including the following:

- Invoice;
- Fee Calculation Sheet;
- Project Cost Control Chart;
- Time Report;
- Expense Claim Form.

Fee Calculation

When determining fees for services, the architect should identify and determine the following:

- each component of the services to be provided;
- the cost of production for each component (including direct and indirect costs);
- the profit margin to be achieved.

All projects should generate a profit. The only possible exception to this principle is when the loss is part of a long-range or short-term strategy (such as undertaking a new and unknown building type). Such a loss can be endured only if:

- the loss is clearly forecast;
- adequate reserves are available to underwrite the loss.

The various methods of compensation, or methods of fee calculation, are outlined in Chapter 2.1.10, *Architectural Services and Fees*.

Regardless of which method is selected, the architect should also estimate the amount of time needed to complete all the required tasks for the project, as well as the associated costs, by using staff "billing rates" (also called charge-out rates). This estimate can be used to check whether the proposed fee will be adequate to complete all the services to be contracted, and if a profit can be realized.

For example, when estimating the fees for schematic design, the architect should:

- calculate how many hours it will take to develop one schematic design, by whom, and at what billing rate;
- estimate the time to develop subsequent designs using the same procedure, as it may be necessary to undertake two or three schematic designs;
- define in the agreement how many different alternative schematic designs will be developed;
- quote an additional fee for each subsequent alternative beyond the number quoted.

A "Fee Calculation Sheet" is provided in Chapter 2.2, *Sample Forms for the Management of the Practice*, for this purpose.

Adequate profit margins may not be achieved if:

- additional time on the project is required due to unexpected circumstances;
- additional time is not billable as an "additional service";
- too low a fee was offered or negotiated;
- the time required to provide adequate services was incorrectly estimated;
- the project was poorly managed.

[Note: Additional time is often required when the project is a building type with which the practitioner is not familiar.]

Billing Rates

RAIC Document Six: The Canadian Standard Form of Contract Between Client and Architect defines "direct personnel expense" and provides the opportunity to invoice for services using multipliers when the fees are charged on an hourly basis.

Establishing billing rates is becoming more complex in today's competitive business environment. Billing rates must include overhead costs, including:

- office rent and operating costs;
- equipment purchasing or leasing, and maintenance;
- secretarial, clerical, and bookkeeping services.

Some large offices may have several staff positions that contribute to office overhead; their services are not chargeable directly to clients.

The salaries and benefits of each employee in the practice are known factors and can be converted to an hourly direct personnel expense by dividing the annual salary-plus-benefits (as defined in Document Six) by the number of *billable hours* in a year. One method for determining the number of billable hours in a year is to multiply regular daily hours by 365 days and deduct the following:

- weekends;
- statutory public holidays;
- an allotment of time for vacations;
- an allowance for sick leave;
- an allowance for non-productive time.

The billing rate is determined by applying a multiplier to the calculated hourly direct personnel expense. The multiplier is a factor which includes overhead plus profit, and can vary from 1.8 to 3.0 depending on the size of the practice and its location (such as an urban centre with high costs).

A rule of thumb for calculating billing rates is to add 25% to the hourly rate for payroll burden, double the total to include overhead, and add 50% of the overhead for profit. This is the equivalent of a multiplier of 3.125 applied to the direct personnel expense.

The following is an example for an employee with an hourly wage of $40. In this example, the profit is 20%.

Employee's hourly wage	$40
Payroll burden (25% of $40)	$10
Sub-total (direct personnel expense)	$50
Overhead	$50
Profit (one half of overhead)	$25
Billing Rate	**$125**

Architects that charge less than this formula limit growth and profits.

Utilization Factors

The percentage of billable hours as compared to the total hours of work in a year is called the "utilization factor."

Utilization factor is a percentage determined by dividing the actual billable hours by the total billable hours possible.

$$\% = \frac{\text{actual billable hours}}{\text{total billable hours}}$$

Utilization factors may range from:

- 50-65% for principals;
- 70-80% for senior architects;
- 80-85% for project architects and technical staff.

Some personnel, such as those involved only in marketing or management, may have no billable hours and therefore no utilization factor. Utilization factors should be monitored regularly because of the direct correlation between high utilization factors and high revenue potential.

Illustration 2 is a typical utilization analysis.

Illustration 2: Calculation of Utilization Factors

1. Calculation of Total Available Billable Hours		
1.1 Available hours:	37.5 hours x 52 weeks =	1,950 hours
1.2 Non-billable hours:		
Vacations	14 days	
Statutory holidays	8 days	
Other	4 days	
Sub-total	26 days x 7.5 hours = 195 hours	
Reduced summer hours	22 days x 2.5 hours = 55 hours	
Total non-billable hours		(250 hours)
1.3 Total Available Billable Hours		**1,700 hours**

2. Utilization Factor	A	B	C	D	A x D
Staff	**Actual Billable Hours**	**Total Available Billable Hours**	**Utilization Factor**	**Billing Rate**	**Fees Billed**
Principal	935	1,700	**55%** $\left(\frac{935}{1700}\right)$	$200/hour	$187,000
Senior Architects (2)	1,360	1,700	**80%** $\left(\frac{1360}{1700}\right)$	$125/hour	$340,000
Junior Architects (2)	1,445	1,700	**85%** $\left(\frac{1445}{1700}\right)$	$90/hour	$260,100
Architectural Technologists (5)	1,580	1,700	**93%** $\left(\frac{1580}{1700}\right)$	$75/hour	$592,500

Project Cost Control Information

Information used to control project costs helps the architect to monitor income, expenses, and profit for each segment of the work on a project. A sample form, "Project Cost Control Chart," is provided in Chapter 2.2, *Sample Forms for the Management of the Practice*. This is a very basic chart; however, many software programs are available to assist the architect in monitoring project costs.

Project cost control information should be monitored regularly to ensure that all tasks are completed within the estimated time and budget.

Time Reports

Time reports or time sheets should record sufficient information to provide summaries of time spent, on a weekly basis, for each task or portion of architectural service. The type of service and phase of the project should be accurately identified in order to measure budgeted time against actual time spent.

For example, if a fee for schematic design has been budgeted at $12,000 and if one person with an hourly wage of $40 per hour will be assigned to produce this schematic design, the practice must budget $125 per hour, which calculates out to $12,000 ÷ $125 = 96 hours. If the individual has a utilization rate of 90%,

then 90% of 37.5 hours per week = 33.75 hours of billable time. At a rate of 33.75 hours per week, it would take 96 hours ÷ 33.75 = 2.84 weeks (nearly 3 weeks) to complete the work. Reviewing the weekly time sheets in conjunction with the progress of the work will help to verify whether or not the design is advancing at approximately 33% per week.

A "Time Report" form is provided in Chapter 2.2, *Sample Forms for the Management of the Practice*.

Cash Flow Forecast

A cash flow forecast is helpful in projecting the practice's cash position over a 12-month period. Such a forecast is needed to determine how much cash will be required to meet expenses for the short term and for any additional requirements of working capital from a line of credit.

The forecast should reflect the following on a monthly basis:

- operating funds required;
- line of credit required;
- relationship between revenues and operating expenses.

Several computer software programs are available to assist in the preparation of these forecasts. In preparing a cash flow forecast, a client's payment history should be considered because many clients take longer than 30 days to pay invoices. The forecast should be monitored every month by comparing actual revenues and expenses with those forecast. The forecast should be updated quarterly. A sample cash flow forecast is shown on Illustration 3.

Invoicing

The use of the invoice form is discussed in section 2.1 of Chapter 2.2, *Sample Forms for the Management of the Practice*. Useful tips on invoicing and collecting accounts are found in Chapter 2.1.9, *Risk Management and Professional Liability*.

Other Financial Management Issues

Compensation

Ideally, compensation for all professionals in an architect's office should be similar to compensation paid in other professional practices, assuming similar levels of responsibility as well as similar time and energy expended. In reality, all staff — including senior, junior, and intern architects; technical staff; and support staff — are compensated based on market conditions. Compensation also includes comfortable working conditions and professional career opportunities and challenges.

Surveys and information on standard levels of compensation are available from:

- federal government surveys;
- surveys by professional associations;
- surveys by architectural journals;
- an exchange of information with other architectural practices.

Proper financial management and current statistics enable the architect to properly compensate staff, thereby helping to increase productivity.

Tax Planning

Accounting advice should be sought for proper tax planning. The financial management of an architectural practice must consider the following taxes:

- **Goods and Services Tax** (GST), or Harmonized Sales Tax (HST) in some provinces, must be collected on all income. The total amount collected is reduced by the amount of GST/HST paid to vendors. The difference due to the government is usually paid quarterly.
- **Employees' income tax** is deducted by the practice for every employee for every pay period. Payment is made to the federal government at intervals determined by the pay period. Income tax deductions include provincial income taxes as well as federal income taxes, CPP, and EI.
- In Québec, federal income tax and EI are paid to the federal government; provincial income tax and QPP are paid to the provincial government.

Illustration 3: Sample Cash Flow Forecast

Cash Flow Forecast													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Cash/Bank Begin Month	$12,500	$13,590	$6,700	$4,790	$5,180	$4,570	$8,660	$2,050	$(360)	$3,030	$10,920	$11,510	$15,350
Revenue													
Acme Addition	$8,500	$4,000	$4,000	$1,500	$1,500	$1,500	$1,500	$1,000	$500	$500	$500	-	$25,000
Dromme House	$4,000	$4,000	$3,000	$3,000	$3,000	$2,500	$1,500	$500	$500	$500	-	-	$22,500
St. Bergen Church	$6,500	$3,000	$2,500	$1,000	$1,000	$1,000	$500	$500	$500	$500	-	-	$17,000
Drummville School	$5,000	$2,500	$2,500	$1,500	$1,000	$500	$500	$500	-	-	-	-	$14,000
Roberts Montessori	$4,500	$3,500	$2,000	$1,000	$500	$500	$500	$500	-	-	-	-	$13,000
Glayburne Residence	$1,000	$4,000	$2,500	$1,500	$500	$500	$500	-	-	-	-	-	$10,500
Boros Cottage	$500	$3,500	$1,500	$500	-	-	-	-	-	-	-	-	$6,000
Muffler Shop	$1,000	$1,000	$2,500	$4,500	$1,500	$500	$500	-	-	-	-	-	$11,500
Spirios Restaurant	$500	$1,500	$2,500	$6,000	$2,000	$1,000	$1,000	$500	$500	$500	$500	-	$16,500
Port Hope Townhouses	-	$1,500	$2,500	$6,500	$12,000	$12,000	$3,500	$3,000	$3,000	$2,000	$1,000	$1,000	$48,000
Boros Apartment	-	-	-	$1,000	$4,500	$8,000	$7,000	$1,500	$1,500	$1,000	$1,000	$1,000	$26,500
Sub-total	$31,500	$28,500	$25,500	$28,000	$27,500	$28,000	$17,000	$8,000	$6,500	$5,000	$3,000	$2,000	$210,500
Marketing Target (potential projects)	-	-	-	-	-	$5,000	$10,000	$15,000	$20,000	$25,000	$25,000	$30,000	$130,000
Forecast Total	$44,000	$42,090	$32,200	$32,790	$32,680	$37,570	$35,660	$25,050	$26,140	$33,030	$38,920	$43,510	$355,850
Expenses													
Payroll	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$192,000
Consultants	$9,500	$7,000	$6,500	$6,000	$6,500	$8,000	$6,500	$4,500	$2,000	$1,000	$6,500	$7,500	$71,500
Rent	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$28,800
Membership dues	-	$1,280	-	-	-	-	-	-	-	-	-	-	$1,280
Insurances	-	$6,200	-	-	-	-	$6,200	-	-	-	-	-	$12,400
Supplies	$250	$250	$250	$250	$250	$250	$250	$250	$250	$250	$250	-	$2,750
Marketing	$800	$800	$800	$800	$800	$800	$800	$800	$800	$800	$800	$800	$9,600
Reproductions	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$2,400
Furniture/Equipment	$600	$600	$600	$600	$600	$600	$600	$600	$600	$600	$600	$600	$7,200
Telephone	$160	$160	$160	$160	$160	$160	$160	$160	$160	$160	$160	$160	$1,920
Miscellaneous	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$2,400
Legal/Accounting	$300	$300	$300	$1,000	$1,000	$300	$300	$300	$500	$500	$300	$300	$5,400
Forecast — Total Expenses	$30,410	$35,390	$27,410	$27,610	$28,110	$28,910	$33,610	$25,410	$23,110	$22,110	$27,410	$28,160	$337,650
Cash/Revenues — Expenses (end of month)	**$13,590**	**$6,700**	**$4,790**	**$5,180**	**$4,570**	**$8,660**	**$2,050**	**$(360)**	**$3,030**	**$10,920**	**$11,510**	**$15,350**	**$18,200**

- **Personal income tax** is usually based on the previous year's income taxes and should be remitted in quarterly installments. An accountant may provide the architect with a schedule for remittances.
- **Provincial sales tax** (PST) is paid as supplies are purchased. Unless these supplies are sold again, PST is not collected or required to be collected by architectural practices, except in Québec where it must be collected.
- **Corporate taxes**, if the practice is incorporated, will be estimated by the accountant and should be remitted quarterly.
- **Business taxes** are charged by some municipalities for operating a business in their jurisdiction. [Note: in some municipalities, an architectural practice requires a business licence in order to provide services for a project located in that municipality, even though the practice is located elsewhere.]

[Note: the penalties for late payment are severe, and taxes should always be remitted on time.]

Definitions

Accounts Payable: A record of accounts of money payable to consultants and to other suppliers for overhead expenses.

Accounts Receivable: A record of professional fees and disbursements which have been invoiced, whether or not payment has been received.

Aging Reports: A record of invoices due and past due.

Balance Sheet: A record of all **assets** such as bank funds, receivables, furniture, computer equipment, and all **liabilities** such as accounts payable and loans, and retained earnings which state the financial position of the practice at a particular point in time.

Cash Book: A record of the day-to-day cash position of the practice using the cash accounting method. All transactions are entered and a running balance is calculated.

Cash Flow: Adequate cash and other liquid assets to meet current payroll, consultants' fees, and other overhead expenses.

Depreciation: The percentage by which capital assets may be depreciated according to government tax regulations (referred to as Capital Cost Allowance).

Direct Personnel Expense: The salary of the architect's or the architect's consultant's personnel engaged on the project plus the cost of such mandatory and customary contributions and employee benefits as employment taxes and other statutory benefits, insurance, sick leave, holidays, vacations, pensions, and similar contributions and benefits.

Disbursement Record: A record of billable reimbursable expenses.

Fiscal Period: A 12-month period for which financial records start and end. (Previously, it was an advantage for a fiscal year to end early in the calendar year. Legislation now requires most professionals to pay taxes on the basis of a calendar year, which encourages the fiscal year-end to correspond to the calendar year.)

General Ledger: A record of all accounts, including receivables, payables, income and expenses, payroll, tax payments, disbursements, etc.

Multiplier: A percentage or figure by which direct personnel expense of staff is multiplied to cover overhead expenses and profit. (The result is used to establish a change-out, or billing rate.)

Annual Budget Calculation Sheet

INCOME	Previous Year	Budget	Change
Professional fees			
Reimbursable expenses			
Interest			
Other income			
TOTAL			
EXPENSES	**Previous Year**	**Budget**	**Change**
Salaries			
Professional staff			
Technical staff			
Support staff			
Payroll burden and benefits			
Consultants' fees			
Management fees and expenses			
Legal fees			
Accounting fees			
Insurance			
Professional liability insurance			
Office insurance			
Life and disability insurance			
Other insurance			
Professional dues			
Professional development and training			
Office premises			
Rent			
Utilities			
Office maintenance and repair			

EXPENSES	Previous Year	Budget	Change
General office administrative expenses			
Printing and reproduction			
Leases for equipment			
Telephone, facsimile, electronic mail			
Office supplies			
Computer hardware, software, and maintenance			
Photography			
Postage and courier			
Taxes			
Business			
Property			
Other taxes			
Interest			
Charitable donations			
Automobile expenses			
Public relations and marketing			
Travel and entertainment			
Printing and proposal preparation			
Depreciation			
Losses and bad debts			
TOTAL			
PROFIT (income less expenses)			



2.1 Management of the Practice

2.1.5 Office Administration

Introduction

Office Policies and Procedures

Office Premises
- Maintenance
- Security
- Office Insurance

Filing and Retrieval Systems
- Filing Systems
- Retaining Files
- Archiving Project Records
- Archiving Electronic Files

The Office Library

Computer Systems
- The Internet and E-mail
- Computer Systems for Office Administration
- Computer Systems for Building Information Modeling (BIM) and CAD
- Computer Training
- Upgrading Hardware and Software

References

Checklist: Information to include in a Manual on Office Policies and Procedures

Chart: A Project Filing Format

Office Administration

Introduction

An architectural practice must be well-organized and well-managed in order to provide proper architectural services to the public and to be profitable. As well, good management decreases exposure to risk and liability. (Refer also to Chapter 2.1.9, *Risk Management and Professional Liability*.) This chapter discusses several methods for improving the administration or management of an architectural practice.

Office Policies and Procedures

It is important to establish policies and procedures which govern the day-to-day operations of the architectural practice and to ensure that all employees are familiar with them. Therefore, policies and procedures should be documented in writing, ideally in the form of an "office manual." Amendments or new information may be added from time to time. The office manual is an important tool for both large and small offices. It becomes a guide to both management and staff regarding the many aspects of managing an architectural practice.

One advantage of such a manual is that, by adhering to its policies, all staff are treated fairly and consistently. The office manual is also a valuable resource when interviewing and hiring new staff. Prospective employees are understandably interested in learning about the firm's policies on such basic issues as working hours, overtime (if applicable), vacations. With an up-to-date office manual, principals can respond to these questions confidently and in a manner that is consistent with the policies already applied to existing staff.

The office manual can also help to communicate the firm's philosophy, goals, and, possibly, "mission statement." This helps to ensure that staff are aware of the principals' underlying objectives and what is expected of staff. Some practices require all staff members to sign and date an acknowledgement attesting to the fact that they have read the office manual and agree to its terms.

At the end of this chapter, the "Checklist: Information to include in a Manual on Office Policies and Procedures" lists some of the issues to resolve and to include in an office manual.

Office Premises

The architect's office is a multi-functional operation. In addition to being the centre for the operation of the practice, it also fulfils a promotional role. The appearance of the office makes a statement about the practice's image and, to a certain extent, its degree of organization. As well, the space provides an opportunity to display examples of built projects and current designs. The first impression that visitors or prospective clients receive when they visit the office will be a lasting one. Therefore, the office should reflect the firm's philosophy by being orderly and well-organized. The premises also should support the organization and facilitate the control of all types of documentation.

The office can also be an opportunity to showcase a design that enhances the health and productivity of staff and promotes best practices in sustainable design, such as, daylighting and views; the use of "green" materials; good indoor air quality; and flexible, energy-efficient controls for ventilation and lighting.

Maintenance

The busier and more successful a practice becomes, the easier it is to ignore minor maintenance needs to the detriment of the office's professional image. One solution is to engage a reliable maintenance person — perhaps on an ongoing, as-needed basis — to address minor repairs quickly and economically. Arrange regular office cleaning to suit the size of

the firm and the level of activity in the office. Small practices may require a cleaning person once per week and may choose to have staff take on some chores. Mid-sized offices may require more frequent service, and larger offices may require cleaning every evening. Cleaning services may be part of the lease in an office building.

When engaging office maintenance firms, architects should consider the need for office security and requirements for a bonded company.

Security

An architectural practice may have two areas of concern for security:

- security of computer systems;
- external security.

Security of Computer Systems
Security for each computer station is usually accomplished by the use of password protection. One approach for a small architectural practice which is not "networked" is to provide limited password protection. Under this system, access via a password is limited to certain files or projects. Principals may wish to set up password protection for certain managerial files. Computers used for accounting or bookkeeping purposes may require separate security provisions.

For networked offices, a hierarchy of security may be required. By definition, a networked office is designed to share information — particularly drawing files — among members of the firm. Too much security could reduce efficiency. A balanced approach to security and access to information should provide both without sacrificing either.

External Security
External security refers to the need to protect the office itself from intrusion to avoid theft or vandalism. Adequate security is important to protect confidential documents and computer databases. Some offices have a fire-rated "vault" for the storage of important documents and original software. It is also common practice for principals to store copies of documents in an off-site location, such as their personal residences.

Security systems vary in their complexity and features. A minimum standard should include an electronic alarm system, connected to a siren or signal and possibly monitored by a central security office.

Control of office keys is a concern too because of staff turnover. The practice should maintain a master log to control the distribution and retrieval of all keys. Depending on the rate of staff turnover, it may be appropriate to re-key locks on a regular basis.

Office Insurance

Insurance protection is important for covering the physical assets of the architectural practice. Most commercial office insurance policies are "package" forms, meaning that certain coverages are automatically included. Some of the extensions to property insurance usually available with a commercial policy package include the following:

- office contents, such as furnishings and computer hardware, software, and data;
- accounts receivable;
- exterior signs;
- personal effects of employees;
- glass coverage;
- valuable papers;
- property off premises (that is, located in site offices, employees' homes, etc.);
- property in transit;
- newly acquired location coverage;
- crime coverage.

In addition to property coverage, the policy should include Commercial General Liability (C. G.L.) protection.

The practice should consider other insurance protection, including:

- tenants' legal liability coverage;
- non-owned automobile liability coverage;
- employer's liability protection.

If the practice is a home-based business, a "Home-run Business" endorsement may be required on the home insurance policy.

An insurance broker can discuss the operation of the practice and advise on office insurance requirements.

Refer also to Chapter 2.1.1, *Organization of an Architectural Practice*, for other types of insurance requirements.

Filing and Retrieval Systems

It is good practice to thoroughly document all project activities and communications. Documentation minimizes the potential of future conflicts and provides the basis of a solid defence in the event of a claim being made by any project participant or if the architect is faced with other legal action.

Some of the types of documentation that the architect should maintain are described in Chapter 2.2, *Sample Forms for the Management of the Practice*, and Chapter 2.4, *Sample Forms for the Management of the Project*.

This section discusses possible filing systems in an architect's office for storing and retrieving this documentation.

Filing Systems

A successful filing system provides a central location for all project documentation and, more importantly, permits easy and immediate retrieval of information. The architect should consider printing file numbers on all correspondence to identify incoming mail, facilitate routing, and, finally, coordinate with filing procedures. Refer to Chapter 2.2, *Sample Forms for the Management of the Practice*, for a sample stamp for all correspondence. Files should not be created unless there is sufficient documentation or correspondence to warrant them. If a piece of communications discusses more than one subject, it should be duplicated and placed in all the appropriate files.

An architectural practice will require at least two types of filing systems:

- filing of information relating to the management of the **practice**;
- filing of information related to the management of the **project**.

Information related to the management of the practice may include employee records, business and professional liability insurance information, and overall financial records. This information requires a special — and possibly confidential — filing system, organized to meet the needs of each practice.

It is also important to establish some form of filing system for marketing, promotional materials and communications which are generated in seeking new commissions. Referencing past proposals is important when pursuing new opportunities.

In addition, a separate file or series of files is usually established for each project, frequently filed by the project number. Key information should be at the start of the project file. Refer to Form 1.5, "Project Team Directory," in Chapter 2.4, *Sample Forms for the Management of the Project*, for a sample form.

One suggested system for filing project information is based on an architectural project's major phases:

- Pre-design;
- Design;
- Construction Documents;
- Bidding/Contract Award;
- Construction;
- Post-construction.

Within each phase, general headings can be provided which include categories for correspondence by, or to, the design or construction team members. This system provides flexibility and can be changed or expanded to suit the requirements of a particular project. Colour-coding the filing system can be used to identify file folders quickly.

The "Chart: A Project Filing Format," at the end of this chapter, suggests a possible project filing system. The Project Filing Format is intended as a guide only, and should be adapted to suit the needs of the individual architectural practice.

Retaining Files

The architect should always be aware of the potential for professional liability. Therefore, records should be maintained well beyond completion of the project. Good records help to prepare a good defence. However, maintaining extensive files for long periods may create storage problems. The architect should consider outside storage or digital storage, once the contractor's one-year guarantee/warranty has expired.

At a minimum, all project records should be retained until after expiry of the limitation period

for pursuing a claim for professional negligence. The time period contained in the statutes of limitations varies from province to province. Refer to the "Chart: Comparison of Statutes of Limitations in Each Province," in Chapter 2.1.9, *Risk Management and Professional Liability*.

Archiving Project Records

One final task often overlooked on a project is organizing records so that files will be orderly, well-labelled, up-to-date, and easily located. This is critical when information on a project is needed at a later date. Frequently, the retrieval is done by others not involved in the original project. Some firms place one copy of all final reports in the office library as reference material for future projects.

Archiving Electronic Files

It is also important to archive electronic files. The technology for storing this data is constantly changing and improving. When new software and hardware are purchased, the architect should ensure that they are compatible with the existing system used for storing electronic files.

The Office Library

In addition to a filing system, every architectural office should maintain a reference library. This library may include some of the following:

- information on building design and architectural practice;
- technical information on specific building products (product literature and samples);
- standards, codes, and other information such as statutes and regulations from Authorities Having Jurisdiction;
- information and practice bulletins from the architectural licensing authorities.

These materials should be stored in a central area, where they are easily accessible to the staff for daily use.

Product literature may be in the form of CD-ROMs, manufacturers' three-ring binders, or loose information (often gathered at trade shows or conferences, or received in the mail). Binders should be stored for easy access and identification. Some practices require a "sign-out" sheet for borrowing these binders. The common method for organizing product information is the use of the MasterFormat™ 50 division system with a number on each binder or piece of literature corresponding to the section number of the MasterFormat™ system.

Computer Systems

Architectural offices are usually very computerized. In setting up a computer system, the practice needs to determine its software requirements before purchasing hardware. Software programs and the need for networking will dictate hardware requirements. Since information technology and computer systems are critical to daily operations of an architectural practice, it is prudent to engage an in-house information technology (IT) manager or to have an IT consultant who is always on call.

The Internet and E-mail

All practices should be connected to the Internet and have the capability to receive and transmit E-mail and electronic files. E-mail can be used for the following:

- communicating with clients and consultants;
- identifying project or architectural opportunities (such as on the MERX system);
- posting bid opportunities and documents (such as CANet);
- transmitting electronic drawing files;
- marketing;
- research;
- contract administration, including transmittal of photographs and video field reviews.

Even though all architectural documents are subject to copyright, it should be noted that any electronic drawing which is posted on a "public" Internet site can easily be copied.

Computer Systems for Office Administration

Basic programs for office administration include the following:

- word processing and specification editing software;
- spreadsheet software;
- bookkeeping and accounting software (refer also to Chapter 2.1.4, *Financial Management*);

- project management software (refer also to Chapter 2.3.2, *Types of Construction Project Delivery*);
- contact software (used for marketing);
- anti-virus software;
- human resources management and payroll software.

Computer Systems for Building Information Modeling (BIM) and CAD

It is important to determine the practice's needs for design, drawing, and graphic applications as well as computer modeling (such as energy modeling, daylight modeling, rendering, etc.) and then select the appropriate software before choosing the computer hardware. Hardware must be selected based on the required speed, memory, and networking capabilities to accommodate the selected software.

A rigid schedule and protocol must be developed and adhered to for the backup of all electronic information. Because back-up tapes could be destroyed in the event of a fire or other disaster, they should be stored off-site. Refer also to Chapter 2.3.7, *Construction Documents — Drawings*.

Computer Training

If staff of an architectural practice are not adequately trained to use the available software, productivity will suffer. Formal computer training, as well as informal in-house training programs, can lead to significant improvement in performance. An annual budget for computer training should be established for this basic need.

Upgrading Hardware and Software

Computer technology requires that both hardware and software be monitored, reviewed, and upgraded when it is necessary to remain current and competitive. Software upgrades may be needed when the software companies develop new versions of their programs. Hardware upgrades are required on an ongoing basis (to provide greater speeds, better resolution, faster or different outputs, or more memory). Careful management of the inventory of computer software and hardware is an ongoing necessity of office administration.

References

Franklin, James R. *Current Practices in Small Firm Management: An Architect's Notebook*. Washington, D.C.: The American Institute of Architects Press, 1990.

The Society of Design Administration: *Handbook of Design Office Administration*. New York, NY.: John Wiley & Sons, 1999.

Stitt, Fred. *The Operating Manual for the Small Design Office*. Orinda, CA: Guidelines, 1993.

Checklist: Information to include in a Manual on Office Policies and Procedures

Firm

- ❑ History of Firm
- ❑ Background of Principals
- ❑ Mission Statement, Philosophy, Goals

Staff Engagement

- ❑ Staff Information
  - Job Descriptions, etc.
- ❑ Overtime Classification
  - Hourly Paid Employees (payment for overtime as per office policy and provincial legislation)
  - Salary Paid Employees (no payment for overtime, subject to provincial employment standards)
- ❑ Performance Review
- ❑ Work Outside Office
- ❑ Codes of Conduct
  - Discrimination
  - Sexual Harassment
- ❑ Notice of Termination

Office Hours, Work Periods, and Personal Leave

- ❑ Working Hours
- ❑ Salaries and Wages (Pay Days)
- ❑ Time Sheets
- ❑ Overtime
- ❑ Personal Time
- ❑ Bereavement Leave
- ❑ Absenteeism
- ❑ Leave of Absence / Parental Leave
- ❑ Time Off for Elections
- ❑ Vacations
- ❑ Public Holidays
  - Paid Holidays
  - Eligibility for Holidays
  - Holidays Occurring During Weekends
  - Holidays Occurring During Vacation
  - Working on Holidays
  - Alternate Days Off
  - Religious Holidays

Benefits

- ❑ Temporary Sick-leave Benefits
- ❑ Pension Benefits
- ❑ Health Insurance Benefits
  - Dental
  - Extended Care
  - Vision Care
- ❑ Professional Development
- ❑ Parking at Office
- ❑ Dues for Membership in Professional Associations
- ❑ Expenses related to the Intern Architect Program (dues, examination expenses)
- ❑ Other

Allowances and Expenses

- ❑ Automobile Allowances
- ❑ Parking
- ❑ Taxi Expenses
- ❑ Entertainment Expenses
- ❑ Travel Expenses
- ❑ Expense Reports

Filing Systems and Retrieval

- ❑ General Filing System
- ❑ Project Files
  - Master Project Number Index
  - Standardized Project Filing Format
  - Technical Files Index
  - Office Administration Files Index
- ❑ File Retrieval
- ❑ New Filing and File Return
- ❑ Financial Files
- ❑ Computer and Electronic Files
- ❑ Sample Library
- ❑ Office Library
- ❑ CAD Standards

Office Administration

- Visitor and Telephone Reception
- Opening and Closing the Office
- Access to Office / Keys or Pass Code
- Meeting Rooms, Kitchen, and Lunchroom
- Word Processing
- Printing
- Equipment (such as hard hats, safety boots)
- Requisition for Supplies / Dispensing of Supplies
- Couriers
- Telephone Messages / Personal Use of Telephone
- Internal and External Mail / Circulation of Trade Information
- Internet and E-mail
- Coffee and Refreshments
- Security Systems / Computer Passwords
- Housekeeping
- Maintenance of Equipment and Office Premises

Employee Acknowledgement

- Signed and dated acknowledgement from each staff member that they have read and agree to Office Policies and Procedures.

Chart: A Project Filing Format

1. General		
1.1 General	1.1.1	Request for Proposal (RFP) and Proposal
	1.1.2	Project Team Directory
	1.1.3	Newspaper Clippings, etc.
1.2 Client / Architect	1.2.1	Correspondence
	1.2.2	Minutes of Meetings
	1.2.3	Agreements
1.3 Construction Cost	1.3.1	Project Budget
	1.3.2	Estimates
1.4 Project Management and Control	1.4.1	Personnel
	1.4.2	Fee Calculation Sheet
	1.4.3	Project Cost Control Chart
	1.4.4	Time Reports
1.5 Project Accounts	1.5.1	Invoices
	1.5.2	Reimbursable Expenses and Expense Claim Forms
	1.5.3	Additional Services

2. Pre-design		
2.1 Client / Architect	2.1.1	Correspondence
	2.1.2	Minutes of Meetings
	2.1.3	Functional Program or Feasibility Studies
	2.1.4	Client's Consultants
2.2 Consultants	2.2.1	as required
2.3 Construction Budget	2.3.1	Construction Budget
2.4 Site Information	2.4.1	Photographs
	2.4.2	Surveys
	2.4.3	Soils or Geotechnical Reports
	2.4.4	Utilities

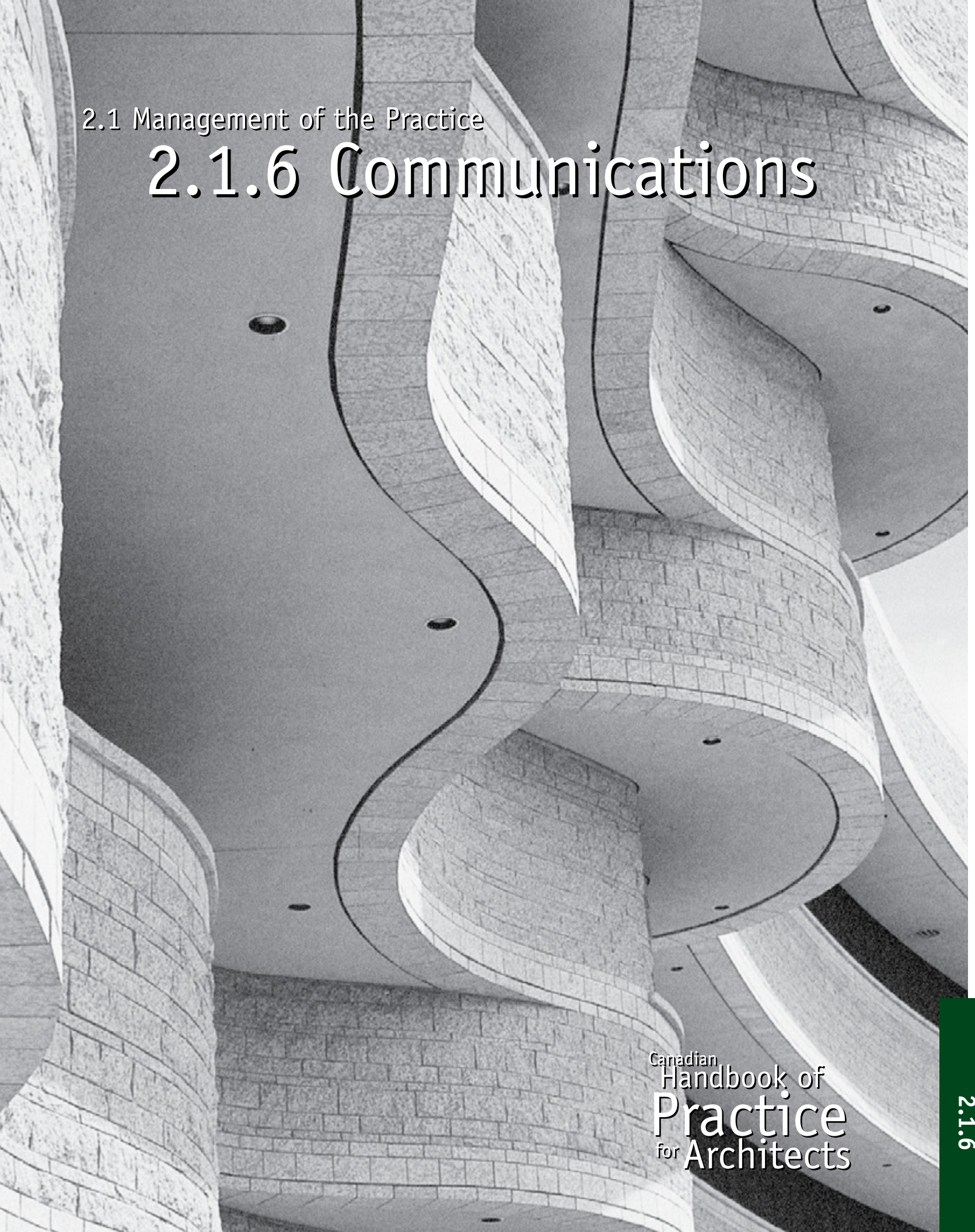
3. Design		
3.1 Client / Architect	3.1.1	Correspondence
	3.1.2	Minutes of Meetings
	3.1.3	Design Report
	3.1.4	Client's Consultants
3.2 Consultants	3.2.1	Structural Engineer
	3.2.2	Mechanical Engineer
	3.2.3	Electrical Engineer
	3.2.4	Other Consultants
	3.2.5	Minutes of Meetings
3.3 Construction Cost	3.3.1	Budget
	3.3.2	Construction Cost Estimate
3.4 Approvals	3.4.1	Municipal Authorities Having Jurisdiction
	3.4.2	Regional Authorities Having Jurisdiction
	3.4.3	Provincial Authorities Having Jurisdiction
	3.4.4	Federal or Other Authorities Having Jurisdiction

4. Construction Documents		
4.1 Client / Architect	4.1.1	Correspondence
	4.1.2	Minutes of Meetings
	4.1.3	Client's Consultants
4.2 Consultants	4.2.1	Structural Engineer
	4.2.2	Mechanical Engineer
	4.2.3	Electrical Engineer
	4.2.4	Other Consultants
	4.2.5	Minutes of Meetings
4.3 Construction Cost	4.3.1	Budget
	4.3.2	Construction Cost Estimate
4.4 Construction Documents	4.4.1	General Information
	4.4.2	Drawings
	4.4.3	Specifications
4.5 Approvals	4.5.1	Municipal Authorities Having Jurisdiction
	4.5.2	Regional Authorities Having Jurisdiction
	4.5.3	Provincial Authorities Having Jurisdiction
	4.5.4	Federal or Other Authorities Having Jurisdiction

5. Bid and Contract Award		
5.1 Client / Architect	5.1.1	Correspondence
	5.1.2	Minutes of Meetings
5.2 Consultants	5.2.1	Structural Engineer
	5.2.2	Mechanical Engineer
	5.2.3	Electrical Engineer
	5.2.4	Other Consultants
5.3 Construction Cost	5.3.1	Final Estimate
5.4 Bid Documents and Addenda	5.4.1	Bid Documents
	5.4.2	Addenda
5.5 Bidders	5.5.1	Invitation to Bid and Advertisements
	5.5.2	Pre-qualifications
	5.5.3	Deposits and Records
	5.5.4	Bid Depository
5.6 Bids	5.6.1	Bid Forms
	5.6.2	Bonds and Bid Security
	5.6.3	Analysis of Bids
	5.6.4	Alternatives and Substitutions
5.7 Contract	5.7.1	Contract Documents
	5.7.2	Bonds
	5.7.3	Insurance

6. Construction		
6.1 Client / Architect	6.1.1	Correspondence
	6.1.2	Minutes of Meetings
6.2 Consultants	6.2.1	Structural Engineer
	6.2.2	Mechanical Engineer
	6.2.3	Electrical Engineer
	6.2.4	Other Consultants
6.3 Construction Cost	6.3.1	Schedule of Values and Applications for Payment
	6.3.2	Certificates for Payment
	6.3.3	Substantial Performance
	6.3.4	Certificates for Release of Holdback and Final Payment
6.4 Supplemental Instructions and Change Orders	6.4.1	Supplemental Instructions
	6.4.2	Proposed Changes
	6.4.3	Change Orders
	6.4.4	Change Directives
6.5 Contractors	6.5.1	Correspondence
	6.5.2	Minutes of Meetings
6.6 Submittals	6.6.1	Time Schedules
	6.6.2	Shop Drawings
	6.6.3	Samples
	6.6.4	Deficiency Lists
	6.6.5	Maintenance and Operating Manuals
	6.6.6	As-Built and Record Drawings
6.7 Field Review	6.7.1	Field Review Reports
	6.7.2	Inspection and Testing Reports
	6.7.3	Photographs and Other Records
6.8 Authorities Having Jurisdiction	6.8.1	Correspondence
	6.8.2	Minutes of Meetings

7. Post-construction		
7.1 Client / Architect	7.1.1	Correspondence
	7.1.2	Minutes of Meetings
7.2 Consultants	7.2.1	as required
7.3 Construction Cost	7.3.1	Cost Analysis
7.4 Contractors	7.4.1	Correspondence
	7.4.2	Minutes of Meetings
7.5 Deficiencies	7.5.1	Warranty Inspections and Defective Work
7.6 Project Records	7.6.1	Occupancy Permits and Other Certificates
	7.6.2	Warranties and Maintenance Bonds



2.1 Management of the Practice

2.1.6 Communications

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Introduction

Three Types of Communication
- Writing
- Listening
- Speaking

Negotiating Techniques

External Communications
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- Consultants
- Contractors

Internal Communications
- Principals
- Staff

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- Electronic Media
- Transfer of Electronic Files
- Video Conferencing
- Voice Mail and Texting
- Courier
- Facsimiles
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Checklist: Planning a Meeting

Communications

Introduction

"Communication is at the center of architecture practice. An exceptionally gifted designer may not achieve success if he or she is unable to effectively communicate ideas to others. The construction process requires collaboration between many people, and architects must be able to communicate in a clear, concise manner for a project to be successful."
- David Greusel, AIA

The spoken word is as ephemeral as the breath with which it is spoken. The written word may last thousands of years.

These two facts demonstrate the importance of effective communications and good documentation.

The value of the spoken word should never be underestimated; in fact, impassioned speeches and great architectural presentations have inspired people to take action that has created monuments and changed the course of history. Nevertheless, the practising architect should rigorously follow two rules: "*say what you mean*"; and "*put it in writing*."

The practice of architecture always requires good communications. Some of the many situations in which communications play a key role include:

- confirming a client's functional program or statement of requirements;
- explaining a design concept to the technologist who will draw it;
- advocating approval for a zoning change to a public body or authority;
- resolving a problem on a construction site.

This chapter will discuss the principles of good communication and describe some of the procedures to improve communications in an architectural practice.

Three Types of Communication

Architects traditionally communicated through drawings. As technology develops and evolves, it is now critical for architects to adopt and integrate many different forms of communication and information technologies, including the internet, video, audio and presentation software. Traditional ways of communicating are:

- writing;
- listening;
- speaking.

Writing

Written communication distributed on paper can easily be monitored and controlled. However, it should be noted that electronic communication can be saved for years and may also be unknowingly delivered to thousands of people.

Maintaining accurate written records of all professional and business dealings, for both the management of the practice and the management of all projects, is important. Clear, written, and complete records can be invaluable in resolving disputes and are the best defence against legal action; every record will receive detailed scrutiny by lawyers of both parties in the event of a lawsuit.

Furthermore, excellent written skills are essential in most practices, not only for services where writing is paramount, such as studies and reports, but also for marketing and presentations.

All documents, both incoming and outgoing, as well as internal memos, should be dated and carry the name of the project. The date on correspondence creates an accurate chronology of events over the course of a project, such as the order in which design sketches were created or the timeliness of supplemental instructions.

This chronology of events may have to be recreated years after everyone involved on a project has left the practice (and perhaps the city or province or country) or may be deceased.

Listening

In verbal communications "active listening" is necessary for understanding the requirements of a problem and the services required.

Active listening includes:

- *observing*, by watching and paying attention to a client's actions, thoughts, feelings, and intentions;
- *amplifying*, by asking for more information;
- *reflecting*, by restating or paraphrasing the client's comments;
- *clarifying*, by seeking further elaboration and understanding of a comment;
- *interpreting*, by offering a conclusion to a remark;
- *summarizing*, by recapitulating the main issues discussed.

Developing skills in "active listening" not only improves an architect's services but can also increase a client's respect for the architect.

Disputes within the construction industry (in fact, most disputes in general) are usually the result of misunderstanding. Developing and maintaining an appropriate attitude to listening and understanding can help to identify critically important project requirements and avoid conflicts.

Speaking

Most architects are aware that a message is conveyed by more than the words being spoken. Communication also includes the tone of voice and body language. Conveying one's message requires a constant awareness of all these different communication methods, and a willingness to hone and practise presentation and communication skills.

Some tips for effective speaking and presentations include:

- assess the setting:
  - where you will stand;
  - where visual materials will be situated;
  - what options are available for lighting;
  - what your relationship will be with the audience;
- use simple, non-technical language;
- speak loudly and enunciate clearly;
- rehearse using a video;
- exaggerate gestures;
- maintain good posture;
- establish eye contact;
- eliminate "blather" (expressions such as "actually," "umm," "like");
- pause frequently.

Negotiating Techniques

For an architect, negotiating is an essential part of communications. Architects, especially principals, need to understand basic negotiating techniques which are useful in reaching satisfactory agreements with:

- clients;
- contractors;
- consultants;
- staff;
- suppliers and others.

There are many "how-to" books and media materials on negotiation techniques, and it is recommended that all principals learn as much as possible about negotiations. The advice of most of these books is to strive for a "win-win" resolution — a reasonable and fair exchange where both parties are better off than they would be without an agreement.

In every negotiation, there are three critical factors:

- time;
- power;
- information.

It is important to remember that price is not always the most important issue and that different people want different things. Negotiations should never be narrowed down to just one issue.

Many claim that physical factors, such as seating arrangements and body language, are significant communication elements when negotiating. It is important to learn and understand negotiating tactics. Refer to the publication *Mastering the Business of Design* (in Ontario, titled *Mastering*

the Business of Architecture) for an explanation of these tactics.
It has been claimed: "Be patient, be personal, be informed — and you can bargain successfully for anything."

Successful negotiations usually conclude with the following characteristics:

- both sides feel a sense of accomplishment;
- both sides feel that the other side cared and was fair;
- each side would deal with the other side again;
- each side feels that the other side will keep the bargain.

External Communications

External communications means communication with those people *outside* the architectural practice. In all communications involving the architectural practice, the architect must:

- be professional;
- be courteous;
- learn to listen;
- respect the confidentiality of clients and the practice.

For forms dealing with external communications, refer to Chapter 2.4, *Sample Forms for the Management of the Project*. It contains the following forms:

- Memorandum;
- Minutes of Meeting;
- Transmittal;
- Project Team Directory.

Clients

The architect's role is to enable the client to make informed decisions; therefore, developing a one-to-one relationship with the individual client or client group is important. The keys to building and maintaining a good relationship with any client include:

- promote "active listening" (see above);
- use simple, straightforward language in all communications;
- be honest, which includes:
  - endeavouring to facilitate the resolution of problems;
  - being willing to admit to not knowing an answer, but promising to find the answer;
- propose solutions rather than problems;
- empathize with the client (for example, do not expect a client to understand graphic images easily; architects are trained to read drawings but clients may not be);
- document thoroughly all decisions relating to a project and confirm their accuracy;
- recognize the client's right and responsibility to make major decisions regarding a project.

The greater the rapport between architect and client, the more easily the relationship will weather any contentious issues which may arise during design and construction.

Refer also to Chapter 1.2.2, *The Client*.

Consultants

Consultants are the architect's teammates on a construction project, whether they are engaged by the architect or retained directly by the client. The goal of the design team is to provide the client with a building project that satisfies the client's needs.

In communicating with consultants, the architect must:

- ensure that consultants are kept current and fully informed about a project's development;
- ensure consultants have incorporated changes, additions, or deletions to project documents;
- document all decisions relating to a project thoroughly and confirm their accuracy;
- understand all recommendations made by consultants.

Refer also to Chapter 1.2.3, *Consultants*.

Contractors

The primary means of communication with the contractor is through the construction documents. When preparing the construction documents, the architect must always remember that they are a communication tool and view them from the standpoint of the contractor. Ensure that the construction documents respond to the following questions:

- Is information easy to find?
- Is information clearly presented?

- Is the material cross-referenced to ensure completeness and clarity of design intent?
- Are unusual conditions and construction details identified and described?

Clearly written bid documents should result in:

- more accurate bids;
- fewer requirements for addenda during the bidding process;
- a smaller spread between high and low bids;
- better understanding of the design intent by the builder and trades;
- fewer delays on the construction site;
- a lower final cost to the building owner;
- a better building.

Regardless of how carefully construction documents are prepared, issues requiring additional communication by the architect will arise.

Communication during construction requires maintaining a proper balance between the need for a speedy response and careful consideration of the instruction or change. The following tips help to maintain good communications with a contractor:

- review the contract and construction documents before answering any questions;
- outline clearly the information or supplemental instructions needed by the contractor;
- confirm all verbal communications promptly in writing, using one of the following:
  - minutes of meetings;
  - Supplemental Instructions;
  - Change Orders;
  - Change Directives;
  - correspondence;
  - field review reports;
- make a note of **every** telephone call with the contractor for the project files.

Refer also to Chapter 2.3.11, *Contract Administration — Field Functions*.

Internal Communications

Internal communications refers to communications *within* an architectural practice.

Principals

Good communications between principals is essential to a healthy practice. Because partnerships usually involve individuals with complementary strengths, the principals are likely to have different ways of viewing the same set of issues and circumstances. This makes good communication even more important.

Marty Grothe and Peter Wylie give useful advice on the meaning of effective communication among principals, in a 1982 article in *Professional Services Management Journal*:

> *Accepting your partners as having a right to be different from you and not trying to make them be more like you;*
> *Being willing to sit down periodically and talk openly about your relationship with each other;*
> *Being able to listen to the other person's point of view, especially when it's different from your own thoughts and feelings, especially when there are problems;*
> *Taking responsibility for the contribution you're making to problems in the relationship, rather than blaming it all on the others;*
> *Being willing to look for solutions to problems that everyone can live with rather than trying to have it all your own way.*

Staff

The staff of an architectural practice is its most valuable resource. Staff members represent the practice through their communications with clients, contractors, and the public. Good communications skills on the part of staff members depend to a certain extent on the culture and goals of the practice.

The following tips help build good communications skills:

- insist on good communications and be a role model;
- communicate regularly with "crits" and reviews;
- communicate openly about issues facing the firm;

- seek out and listen to staff's concerns, and act on valid points;
- be clear and direct in performance evaluations;
- use memos rarely, and only to announce general information.
-

Refer to Chapter 2.1.7, *Human Resources*.

Communication Methods

The following section briefly describes various types of communication.

Meetings

A face-to-face meeting is often an effective way to resolve an issue. Planning and organization are essential for all effective meetings.

Refer to "Checklist: Planning a Meeting" at the end of this chapter.

The following steps help to ensure a "well-run" meeting:

- circulate the agenda and background information ahead of time, if possible;
- state the meeting's purpose;
- begin on time, do not wait for latecomers, and, if appropriate, do not "recap" the past discussion when they arrive;
- stick to the agenda and set time limits for each item;
- keep minutes that record the following:
  - new information;
  - decisions made (not the discussion);
  - further action required, by whom and when;
- defer items that require more in-depth discussion;
- defer items requiring further information, and assign someone to follow up with the research.

A form, "Minutes of Meeting," is available in Chapter 2.4, *Sample Forms for the Management of the Project*.

Telephone Conference Calls

Teleconferencing permits people working in different locations to conduct telephone "meetings" without the cost and time associated with travel and reduces environmental impact Although the benefits of face-to-face and non-verbal communication are lost, teleconferencing is a quick way to exchange views, to poll a group when a vote is required, or to gain consensus for a decision.

The following tips help ensure effective teleconference calls:

- arrange the meeting well in advance to ensure that all parties are available;
- verify time zones of the participants;
- assign a chairperson for the teleconference;
- provide an agenda ahead of time;
- distribute the minutes of the meeting as soon as possible after the meeting.

Electronic Media

Electronic mail (E-mail), company-wide intranet, the Internet, and local area networks (LANs) are the most prevalent methods of communication in architectural practices. It is important that the firm keep a permanent record of e-mail communications for each project. Misused, e-mail can expose an architectural practice to greater liability.

E-mail has its own etiquette and it is more than a "conversational" tool. Before sending an email consider whether or not the message would be appropriate on company letterhead and mailed to a client. It is important that all architectural practices develop policies and procedures for this form of communication because e-mail is not only written documentation but also it represents the firm.

Project-specific Web sites that can be accessed by consultants, contractors, and clients are very typical and become a comprehensive source of project information and a project management tool. All project documentation, as well as site photographs and construction videos, can be viewed on these Web sites.

Transfer of Electronic Files

Design and construction documents are usually transferred electronically often using a specific URL (uniform resource locator) such as a website or FTP site (file transfer protocol). Bid documents may also be distributed electronically without printing any sets of documents.

Contractors can use the electronic files as a basis for quantity take-offs. Many municipalities and construction associations accept electronic submission of documents. Building permit applications are also being processed electronically through various departments within a municipality. Municipalities claim that this improves the ability of information transfer and reduces the time required to process applications. Furthermore, documents can be transferred directly to the construction site. However, a number of issues must still be addressed, such as:

- enforcement of the copyright (electronic documents are very easy to copy);
- increased professional liabilities resulting from undetectable alterations to the electronic documents;
- the application of professional seals and signatures;
- the assurance that electronic files will be readable in the future.
- [Note: although it is widely believed that electronic media deteriorates over time, no one knows for certain the rate or nature of possible deterioration.]

Video Conferencing

Video conferencing provides the benefit of visual communication to participants in distant locations thereby eliminating the need for travel. It can be useful for conferences and professional development, architectural presentations, interviewing or training.

Voice Mail and Texting

Voice mail and texting — systems for leaving (and retrieving) messages — can be an effective communication tool. The following tips for voice mail are helpful:

- speak clearly and slowly, and repeat telephone numbers;
- include enough detail to enable the recipient to provide requested information on the originator's voice mail (this helps to reduce "telephone tag");
- keep messages factual and professional (messages can be archived and used as legal evidence in a dispute);
- advise when and where you can be reached (such as cellular phone, home, another office).

Courier

A courier can deliver material, such as documents on paper, in as short a time as it takes to travel from an architect's office to the final destination. As with other forms of communication, planning saves money — the less urgent the delivery, the lower the costs.

Architects normally use couriers when material such as proposals, contracts, legal instructions or other objects must reach their destination by a specific time. It is important to verify that the courier will guarantee delivery and carries insurance to cover lost items.

Facsimiles

Written communication can be sent via facsimile (fax). Exceptions to this form of communication include:

- legal documents requiring original signatures;
- lengthy documents, which are more appropriately mailed, sent by courier, or transmitted electronically;
- confidential information.

The volume of paper can be reduced by omitting the fax cover sheet for letters which are already addressed to the recipient.

Mail

Although slower than courier services, the basic service provided by Canada Post still has the distinct advantage of being the most economical way to send material from one location to another. Not everything is urgent and, with careful planning, fewer couriers may be required. Confidential material may be sent by mail and can be registered if necessary.

Desk Diary or Personal Digital Assistant (PDA)

The architect's PDA or desk diary can be a valuable communication tool both for the architect and for office staff. The purpose of these tools are to:

- schedule, at least tentatively, appointments and meetings which require the architect's attendance;
- record every appointment, phone call, and significant event in the day;
- remind the architect of past and pending appointments;

- assist staff and others in contacting the architect in an emergency.

It is important that information that should be recorded in project files does not reside only in personal "diaries" where it would not be accessible by others in the future.

Many architect also use computer software such as the Calendar in Microsoft Outlook.

Forms for Communication

Standard forms are essential for managing communications and the necessary of documentation required in an architectural practice. Chapter 2.4, *Standard Forms for the Management of the Project,* provides the following forms for General Communications (together with their purpose and the information to be included in the forms):

- Memorandum;
- Minutes of Meeting;
- Transmittal;
- Project Team Directory.

Definitions

Communication: The science and practice of transmitting information; the act of imparting news; information given; social dealings.

Minutes: The record or notes of a meeting or transaction; a brief summary of the proceedings of a meeting; an official memorandum authorizing or recommending a course of action.

References

Alessandra, Tony. *The Dynamics of Effective Listening* (audiocassette). Niles, IL: Nightengale-Conant Corporation, 1994.

Angell, David. *The Elements of E-mail Style*. Don Mills, Ont.: Addison-Wesley Publishing, 1994.

Stone, David A.
Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives, Inc., 1999.

Checklist: Planning a Meeting

When planning a meeting, consider the following checklist:

1. Planning

- ❑ Establish a need for the meeting.
- ❑ Define the problem(s).
- ❑ Research the facts and issues.
- ❑ Establish objectives for the meeting.
- ❑ Determine the most suitable type of meeting.
- ❑ Outline meeting expectations and accomplishments.
- ❑ Consider leadership (identify a chairperson and a discussion leader for each item).
- ❑ Develop and distribute a preliminary agenda.
- ❑ Determine who should attend, and why.
- ❑ Determine the pre-meeting information needed by each participant as well as the data each participant is required to bring to the meeting.
- ❑ Allow sufficient preparation time for research and preparation of each agenda item.

2. Organizing

- ❑ Prepare and distribute a final agenda, identifying who is responsible for each topic or item.
- ❑ Prepare and distribute background information.
- ❑ Discuss with the chairperson the style of the meeting and the chairperson's role.
- ❑ Determine the format of the minutes, including a report system regarding achievement.
- ❑ Consider a dry-run — if necessary, make appropriate changes.
- ❑ Determine the criteria for agreement on contentious issues.
- ❑ Consider the contributions required from the participants.
- ❑ Identify a convenient time and location, and confirm this with participants.
- ❑ Become familiar with the actual meeting place and surroundings.
- ❑ Prepare meeting material and organize logistics (audio-visual aids, reports, handouts, coffee).
- ❑ Determine who will be the recording secretary; define this person's role; obtain agreement as to expectations and timing.

3. Role of the Chair in Facilitating the Meeting

- ❑ Introduce the participants and their roles, and the meeting's objective.
- ❑ State the problems and criteria for agreement (agenda).
- ❑ Establish the guidelines for solutions.
- ❑ Ensure all possible solutions are reviewed.
- ❑ Keep on the subject, periodically restate the meeting's objectives, and continually monitor the time.
- ❑ Summarize problems and agreements.
- ❑ Encourage inter-group communications.
- ❑ Restate objectives and conclusions, and obtain agreement.
- ❑ Resolve problems or conflicts.
- ❑ Decide on a course of action, i.e., implementation of conclusions or decisions.

4. Minutes

- ❑ Develop a format for minutes.
- ❑ Establish a method for distributing minutes.
- ❑ Determine the recipients of minutes (in addition to attendees).
- ❑ Distribute the minutes as soon as practical after the meeting.

2.1 Management of the Practice

2.1.7 Human Resources



Canadian Handbook of Practice for Architects

2.1.7

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Checklist: Issues for Consideration in an Employment Agreement

Human Resources

Introduction

The most valuable resource of an architectural practice is its people: principals and staff. Over the years, the science of human resource management has evolved and generated various theories about the factors that motivate people to be productive. Current theories suggest that self-fulfillment, is the sole motivating factor.

Vital to every organization, especially an architectural practice, is the collective personality or "culture," that emerges from the combined talent pool. The mix of individuals in a firm is as important as the individual strengths of each member in determining the future of the practice. Therefore, to help shape its culture, a firm needs proper screening and evaluation procedures for selecting employees.

The principals of the practice should develop and agree on the culture and values of their firm in a strategic plan. Refer to Chapter 2.1.1, *Organization of an Architectural Practice*, for the contents of a strategic plan.

This chapter will discuss human resources issues within an architectural practice.

Recruiting Staff

When the principals of a practice require additional skills or help, they must determine whether to hire new employees or to retain consultants to fill the gap. Projected cash flow or billings for both the short and intermediate term must be considered in order to determine the extent of staffing the firm can support. All the alternatives should be reviewed. The principals must consider the following costs:

- base cost of salaries, and costs to cover statutory employer contributions such as Canada/Québec Pension Plans (CPP/QPP), Employment Insurance (EI), workers compensation premiums, vacation pay, health tax, other benefits offered by the practice, and profit.[Note: an accountant will be familiar with the specific requirements];
- indirect costs to provide management, direction, and professional development for employees.

Refer also to Chapter 2.1.10, *Architectural Services and Fees*.

The three possibilities for meeting human resources needs are:

- independent contractors (sometimes incorrectly termed "contract workers" or "contract employees");
- temporary employees;
- permanent employees (full-time and part-time).

The architect should consult relevant information from the Canadian Revenue Agency as well as the provincial labour laws to fully understand the implications associated with each of the three options noted above. If necessary, the architect should obtain legal advice.

Independent Contractors

Independent contractors are similar to consultants and are normally retained on a short-term, per-project basis. They may be supplied by another firm or agency, or contracted directly. They are usually paid a stipulated hourly rate or fixed fee, with no deductions for income tax, Canada/Québec Pension Plans (CPP/QPP), or Employment Insurance (EI), and they receive no vacation pay. Because independent contractors are responsible for their own contributions, they are usually paid a higher hourly rate than a permanent employee or they are engaged on a fixed fee basis for specified tasks or a specific time frame.

The terms of engagement should always be confirmed in writing prior to the commencement of work, and payment should be made only after the contractor submits an invoice. The terms of engagement should also include issues such as:

- confidentiality;
- copyright;
- credit for authorship;
- use of documents in portfolios, etc.

Hiring an independent contractor, or "out-sourcing," is a common technique for determining project costs and limiting payroll responsibilities. The architect should ensure that the work is suitable, such as task-oriented work where a specific product (such as a certain number of drawings) or service is known. The actual work may occur within the architect's office but with *minimal* supervision by the architect. According to Canada Revenue Agency regulations, work by independent contractors is *not* a legally acceptable substitute for most employment situations.

Temporary Employees

Temporary employees often hired for a fixed period of time, determined prior to the commencement of work. Generally, temporary staff work under identical terms and conditions as permanent employees, except that certain benefits offered to permanent employees may not apply to temporary employees. In addition, less investment is required for professional development.

Typically, temporary employees fill staffing voids created by short-term absences of permanent employees. However, they may also "fill in" during short-term peaks in workload to avoid burdening permanent staff with overtime work. The morale of permanent employees is improved by retaining a core staff and augmenting them with temporary help. Temporary clerical or professional staff may provide efficiencies by performing tasks not requiring the skills of senior people. This frees up senior people to concentrate on more valuable activities.

Temporary employees can also compensate for gaps in the skills of existing staff — for example, a retired or other specialized professional can provide additional expertise for a specific project.

Permanent Employees

Permanent employees are vital to the long-term health and stability of an architectural practice. An appropriate mix of professional staff, technologists and technicians, and support or administrative personnel is necessary to realize both the business objectives and mission of the firm. Some practices, with a focus on design, hire architects and intern architects exclusively, augmented only by support staff. Other firms, with a focus on service, rely heavily on senior technical staff to manage and deliver projects. When engaging new employees, it is advisable for the architect to determine if their personal objectives and ambitions will mesh with the requirements and culture of the practice.

Recruiting

When hiring new staff, the architect may wish to develop an appropriate job description, seek qualified candidates, and conduct interviews. Forms contained in Chapter 2.2, *Sample Forms for the Management of the Practice*, can assist in the hiring process. These forms are:

- Typical Job Description;
- Interview Evaluation Form;
- Employment Agreement.

Employment Agreements

An offer of employment is a contract with legal implications. Often a verbal offer is accepted during an interview. To avoid misunderstandings, verbal offers should be confirmed **in writing**, stating all the terms of engagement. Refer to the "Checklist: Issues for Consideration in an Employment Agreement" at the end of this chapter. In addition, a sample "Employment Agreement" and a detailed guide for its use is contained in Chapter 2.2, *Sample Forms for the Management of the Practice*.

Managing Human Resources

Managing professionals presents unique challenges, because professionals are usually career-oriented and strive for upward mobility.

Office Conduct

The success of any architectural practice depends on the conduct, manners, and performance of staff or the "team." All staff in an architectural practice expect and deserve professional treatment. Consultants, peers, and employees should all be treated with the same respect and courtesy.

When working in stressful, "deadline-oriented" environments, architects can sometimes become impatient. Architects must realize that the urgency "to get the job done" has to be balanced with the cost of damaging goodwill. Principals and staff who are confrontational lose the respect and cooperation of their colleagues.

Valuable time and effort is lost when alienated employees leave a practice. It has been stated that architectural practices spend approximately 25% of a lost worker's salary in recruiting and training a replacement. An architect's time is more effective when spent on strategic activities for the practice rather than hiring and training new staff.

Standard office policies and procedures for conduct should be established and included in an "office manual." Refer to Chapter 2.1.5, *Office Administration*, for information to include in the manual.

Statutory Benefits

The architect is required by law to provide employees with the following benefits:

- **Employment Insurance (EI)** — EI is calculated on the basis of each employee's insurable earnings. The employer contributes 140% of the amount (or 1.4 x) that the employee contributes. When an employee stops working, a Record of Employment (Form INS 2106) must be filed with Canadian Revenue Agency. Depending on the number of weeks of work and the salary level, benefits are payable by the Government of Canada.
- **Canada Pension Plan (CPP)/Québec Pension Plan (QPP)** — CPP/QPP is calculated on the basis of pensionable earnings. The employer and employee contribute equally. Benefits are generally not payable until after the age of 60 to 65 and relate to an employee's total lifetime earnings.
- **Workers Compensation or Workplace Safety Insurance Board** — The payment of premiums is required. (Refer also to Chapter 1.2.1, *The Construction Industry*.)
- **Vacation Pay** — Employee vacation pay varies from province to province. The amount is usually three weeks per year, but it is two weeks in some jurisdictions. Check with provincial labour legislation. Vacation pay or vacation period is frequently increased at certain intervals at the discretion of employers. Vacation pay is accrued on the basis of a pay period and becomes payable when an employee leaves the practice.
- **Overtime** — In some jurisdictions employees paid on a salary basis are generally not required to be paid for overtime. Employers should establish employment agreements and office policies for overtime after conferring with provincial employment regulations and standards. Workers paid hourly are often required to be paid overtime, usually at a rate of time-and-a-half following a specific number of hours per week. **The length of the standard work day and work week determines when and if overtime must be paid, and this varies from jurisdiction to jurisdiction, as do overtime rates for holidays.**

When not paid out as it accrues, overtime compensation can create significant financial liabilities and should be carefully monitored.

Time Off

Time off for sick time, religious days, personal time, bereavement, etc., is at the discretion of the employer. To clarify the issue and to prevent abuse, principals should establish an office policy which states the circumstances in which paid time or unpaid leave may be taken. Some firms set a limit for the number of days that may be taken in a year. Excessive use of time off by staff warrants investigation.

Other Benefits

In addition to statutory benefits, some firms offer other benefits such as:

- extended health care;
- life insurance;
- pension plans;
- disability insurance;
- dental and vision care plans.

These benefits are usually provided on the basis of shared contributions by the employer and the employee. Insurance programs and pension plans vary. As these also have tax planning implications, the architect may wish to seek professional advice before offering them.

Incentive programs are a management tool to reward productive employees. Many firms offer bonuses, but only in profitable years. Some practices use profit-sharing or share ownership to distribute profits. Others believe that staff should be rewarded through higher salaries, and that bonuses or profit-sharing become institutionalized and eventually lose their incentive value.

Other benefits may include:

- coffee and beverages (at the office);
- use of company vehicles;
- social events;
- registration and attendance at professional development activities, such as conferences and courses.

Work from Home

Some practices allow employees to perform part or all of their work from home, through E-mail or other forms of electronic communication. Supervising work prepared off site may be difficult. The burden of coordination and checking is sometimes more onerous, and mistakes can easily be overlooked. Furthermore, the architect must determine whether the off-site work can be under the "care and control" or "direct supervision" (also called "responsible control") of the registered member in order to apply the architect's seal, as required under certain provincial or territorial Architects Acts. Refer to the chart, "Comparison of Provincial Requirements/Guidelines regarding the Application of Seals," in Chapter 1.1.4, *The Organization of the Profession in Canada*.

Harassment

Harassment includes any unwanted physical or verbal conduct that offends or humiliates. It can foster a negative work environment which interferes with job performance and productivity. Employers are liable under the *Canadian Human Rights Act* for harassment occurring on the job, whether or not management is a direct participant. Harassment will be considered to have taken place if a reasonable person ought to have known that the behaviour was unwelcome.

Harassment includes:

- threats, intimidation or verbal abuse;
- unwelcome remarks or jokes about subjects such as race, religion, disability, sexual orientation or age;
- displaying racist, sexist or other offensive pictures or posters;
- sexually suggestive remarks or gestures;
- unnecessary physical contact such as touching, patting, pinching or punching;
- physical assault, including sexual assault.

As an employer, the architect's duty is to:

- make it clear that harassment will not be tolerated;
- establish a policy dealing with harassment;
- make sure that all employers (principals and directors) and every employee understand the policy and procedures for dealing with harassment;
- inform supervisors and managers of their responsibility to provide a harassment-free environment;
- investigate and take corrective action as soon as a harassment incident occurs, even if a formal complaint has not been received.

Discrimination

Discrimination takes place when one person does not have equal opportunities because of race, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, age, record of offences, marital status, family status, or handicap. As an employer and professional, the architect's duty is to ensure that discrimination is neither practised nor tolerated within the architectural practice.

Motivation and Job Satisfaction

Motivation is a result of personal success and the organization's success. Most studies indicate that money, although important, is not always a primary factor in motivating professionals. Motivation requires the hands-on support of a "coach" who makes time to pay **individual** attention to each staff member.

Motivation works in spirals: success breeds success, whereas failure can likewise feed on itself and become systemic. To break out of a motivational crisis, principals must examine all human resource management systems, including:

- recruiting;
- work assignments;
- performance evaluation and feedback;
- promotion.

The workplace environment sets the tone for motivating professionals. Flexible work situations allow employees to schedule work on their own terms. Clear work instructions permit staff to work independently. This autonomy not only builds independence, but also aids in developing skills and provides more time for management to focus on other activities. However, work performed independently often requires affirmation or correction. The architect might consider formal design "crits" or reviews for each project so that employees can learn from each other.

Employees should be involved in making decisions regarding the delivery of services. Their opinions and talents should be used to find ways for more effective recruitment, project management and quality control.

Design is a significant part of an architect's training; thus, involvement and connection with design activities is frequently a major determinant in job satisfaction.

Not all duties in the practice can be design-related, but all work must be purposeful. Sometimes, inexperienced employees are assigned mundane tasks. However, everyone wants to contribute in a meaningful way to the work and to the world at large. In an architectural practice, **all** work is valuable; pejorative or apologetic attitudes about certain assignments should never be projected. When unskilled tasks are indeed required, the architect should offer opportunities for more challenging work on upcoming projects, and this promise should be fulfilled.

The following are some tips to help nurture staff at various stages of their career development:

Students and Intern Architects Principals should:

- assign a senior person to be an advisor or mentor to each student or intern architect;
- determine what skills are lacking or which tasks (experience requirements) need to be completed;
- develop generalist skills among students and intern architects at this stage of their careers;
- use this opportunity to recruit the best graduates.

Newly Registered Architects and Technologists Principals should:

- allow architectural technologists and newly registered architects to work independently with minimum direction;
- foster close working relationships between other staff and newly registered architects and technologists;
- nurture young staff and help them find a professional niche;
- ensure their career objectives are being met;
- consider investing the time required to make each individual a specialist to the extent that it is affordable.

Senior Professionals Principals should:

- encourage senior professionals to share their accumulated wisdom;
- designate individuals as practice managers for particular tasks — design, specifications, contract administration, marketing, etc.;
- encourage senior professionals to develop new skills, both for themselves and others.

Performance Review

Performance reviews are meant to be objective evaluations of employee performance. However, there is debate about the purpose of employee appraisals — whether the outcomes should be linked to salary or whether they are tools for improving employee performance. When

performance reviews are done badly, they reflect negatively on management and can lead to serious problems in morale and even legal action.

Architects can use several methods for conducting performance reviews:

- **Essay method** — This is a subjective description of the attributes of the employee. It is flexible, but time-consuming, and produces variable results if more than one supervisor is involved.
- **Management by objectives or results method** — This method measures the extent to which the employee conforms to a pre-determined goal or result. The review measures "outcomes" instead of identifying attributes of the employee. It only considers the employee's own ability to improve performance, and does not take into account other factors which may hamper performance. As well, the consequences of how the job gets done are not measured.
- **Rating scales method** — This type of performance review provides a range of possibilities (positive to negative) in response to structured and standardized questions. It is well-accepted because of its perceived objectivity; however, the questions must be relevant to various job descriptions and the appraisers must share a common understanding of the meaning of the questions.

All methods are subject to bias by the appraiser. To be meaningful, performance reviews should be done by a supervisor who is familiar with the employee and has the employee's respect. Both the employee and the appraiser should prepare in advance for the meeting. If the performance review is only conducted once a year, it should be formalized. Constructive feedback should be given at the performance review **and** on an ongoing basis. Formal performance reviews should not replace spontaneous praise or criticism, which are essential to good human resources management.

Other types of performance reviews include:

- employee self-appraisal (useful as a complement to supervisor appraisal);
- the "360 Degree Performance Appraisal" in which peers, subordinates, supervisors, and clients comment on performance.

Refer to Chapter 2.2, *Sample Forms for the Management of the Practice*, for a sample Performance Evaluation Form.

Professional Development or Continuing Education

Ongoing professional development is an important part of architectural practice. All provincial and territorial associations of architects require continuing education to maintain a professional licence or registration. The firm's resources and the principals' commitment to a "learning culture" will help determine the form and extent of professional development for employees. Professional development is good business practice. It is the equivalent of a research and development investment by other sectors of the economy. The architect should establish a variety of continuing education opportunities and learning modes, including:

- individual learning:
  - professional reading;
  - individual research;
  - professional writing (including articles, reports for journals, and newsletters);
  - speeches and presentations;
  - tours of architectural sites;
  - videos;
  - participation in the activities of the professional association.
- group learning:
  - conferences;
  - workshops;
  - courses;
  - teaching;
  - discussion groups;
  - lunch and learn seminars;
  - in-house seminars.

Termination of an Employee

Voluntary Resignation

A certain amount of staff turnover can be expected in any organization, but architectural practices experience a higher turnover rate than do many other professional firms. Voluntary resignations (quitting) occur for a variety of personal and professional reasons and often correspond to the availability of other work opportunities. Although the loss of an employee can prompt an emotional response, the architect should:

- accept the resignation gracefully if the employee cannot be dissuaded;
- not belittle or berate the employee for this decision;
- resolve the terms of termination to everyone's benefit, but complete the termination as rapidly as possible to preserve employee morale;
- conduct an exit interview to determine the reasons for the decision. (An exit interview should be conducted soon after the notice and, if possible, performed by two different individuals representing the practice);
- use the exit interview to probe for weaknesses in the practice and seek constructive criticism;
- listen and avoid being argumentative;
- endeavour to part on good terms.

Former employees may be future clients or client representatives.

Layoffs

In an economic downturn, the practice should consider all other possibilities before laying off employees. A smaller staff affects the firm's ability to gain future commissions. Some possibilities include:

- eliminating overtime;
- suspending benefits;
- reducing overhead costs;
- accelerating project start or completion dates;
- asking employees to take accrued vacation time.

If further "belt-tightening" measures are needed, consider:

- cutting salaries;
- reducing the work week for all employees;
- job-sharing;
- loaning employees to other firms temporarily.

It may be helpful to check with Human Resources and Skills Development Canada (HRSDC) regarding programs to assist companies facing layoffs.

The principals should communicate the need for adjustments to work assignments in a staff meeting as soon as the layoffs are required. However, the layoffs should be handled *first* and then followed by a meeting with the staff to allay concerns.

Firing

Firing an employee has the potential for serious legal ramifications. In all situations, the basic principles of fairness must apply. Firings must be, and be seen to be, non-discriminatory business decisions. Notice of unacceptable performance or behaviour must be documented progressively. Office policies and procedures must be applied evenly and should be used as standards for judging the employee's behaviour and performance. Performance evaluations and formal feedback can document sub-standard work. Include the employee's version of the situation as part of the investigation.

An employee should never be fired in a moment of anger or "on the spot." This may increase the likelihood of legal action. If necessary, it is better to suspend an employee for outrageous behaviour, thereby giving one time to "cool down" and investigate the matter.

Procedures for Firing and Layoffs

Termination of a valued employee is traumatic for members of the practice as well as a shock to the employee. Employees who have been fired may be hostile or even violent. The architect as employer should be familiar with the appropriate provincial or territorial employment standards and labour legislation and, if necessary, seek legal advice or assistance from a human

resources specialist. The following tips and procedures help to preserve the dignity of the employee and manage the situation:

- have both the immediate supervisor and a principal attend at the meeting at which the employee is to be fired;
- conduct the meeting in privacy, possibly outside the office;
- hold the meeting early in the day and early in the week to avoid the potential to brood or consider retaliation during the weekend (earlier in the week allows the employee to focus on the future; earlier in the day is less stressful);
- prepare ahead of time;
- communicate the reason for the dismissal but do not provide a step-by-step analysis of the documentation supporting the firing;
- advise that the decision is final and cannot be reversed;
- emphasize that all relevant factors were reviewed;
- stress that the decision was agreed to by everyone involved in management (if applicable);
- advise of the effective date of termination;
- review with the employee a written summary of benefits, including severance pay, vacation accrual, continuation of health/life insurance or other benefits;
- have final paycheques ready if termination is immediate and inform the employee about how to collect personal belongings and leave the premises; or, provide the employee with a written summary of projects to be transferred to ensure a smooth transition if the employee will remain as an active employee for a time and outline the steps in the termination process, such as last day of work, return of keys or other company property;
- finish by indicating that there will be notification of any other matters outstanding;
- wish the employee good luck for the future.

If the termination is a firing rather than a layoff, more time is required to discuss the reasons for firing by asking the employee's version of events, even if an investigation has determined this. Allow the employee to vent emotion. The principals should not interrupt or argue with the former employee, but be firm about the decision and stress that the meeting's purpose is simply to communicate an irrevocable decision.

Definitions

Employee: One who works for and under the full direction of another individual or entity (employer); a person working either full time or part time for an employer and in a manner that satisfies Revenue Canada Revenue Agency's criteria for determining employer-employee relationships.

Independent Contractor: An individual or entity that is not entirely dependent on a single source for business and is distinguished from an employee by having a chance for profit, risk of loss, and a degree of self-control and ownership of tools; a person or firm providing services who is not an employee under Canada Revenue Agency's criteria for determining employer-employee relationships.

References

Ontario Association of Architects (OAA). OAA Practice Bulletin C.3a, *Employment Agreement Checklist of Issues for Consideration*. May 1997.

Woodward, Cynthia A. *Human Resources Management for Design Professionals*. Washington, D.C.: The American Institute of Architects Press, 1990.

Canada Revenue Agency: *www.cra.gc.ca*

Service Canada: *www.servicecanada.gc.ca*

Employment Standards Acts and Regulations of the various Provinces and Territories

Checklist: Issues for Consideration in an Employment Agreement

- ❑ Determine whether the proposed relationship is that of an employee-employer or an independent contractor.
- ❑ If the relationship is one of employment, the parties should consider the following issues:
  - *Identification of Parties* — What is the legal status of the employer? Does the employer's representative have authority to commit the practice to a contract?
  - *Position* — What does the employee have to do for the employer?
  - *Commencement Date* — When does employment start?
  - *Term of Employment* — Does it run indefinitely or for a set period?
  - *Probationary Period* — Is there a probationary period? What are the conditions and obligations?
  - *Hours of Work* — What are the daily and weekly hours of work?
  - *Compensation* — What is the monetary compensation? How and when is it paid? What deductions are made? How is overtime work compensated? When is compensation reviewed?
  - *Benefits* — What are the medical, dental, and professional fees paid or other benefits offered (if any)?
  - *Office Manual* — Has the employee reviewed and acknowledged the office manual on policies and procedures? Refer to the "Checklist: Information to include in a Manual on Office Policies and Procedures," in Chapter 2.1.5, *Office Administration*.
  - *Equipment* — What will the employer provide and what is the employee expected to provide?
  - *Professional Development* — Does the employer have policies on assisting the employee gain experience, attend courses and seminars, etc., leading to improved professional status and advancement within the employer's practice?
  - *Expenses* — For what expenses is the employee compensated?
  - *Vacation, Holidays, Personal Leave* — Under what conditions may the employee take time off? Is the length of vacation adjusted with length of service?
  - *Insurance* — What provisions (if any) are included in the employer's Insurance(s)/ Indemnity Plan to protect the employee?
  - *Legal Advice* — Have the parties to the agreement sought and received legal advice?

- *Termination* — Under what conditions may either party terminate the agreement? What is the length of required notice? Does the notice period increase with length of service to the employer?

- *Confidentiality* — What information learned during the course of employment is to be kept confidential?

- *Restrictive Covenants* — Are there any non-competition requirements after termination?

- *Copyright* — To what extent may an employee in his/her proposal portfolio use the employer's copyrighted material (hard copy and/or electronic reproductions) which the employee prepared?

- *Assignment* — Can the contract of employment be assigned to a successor or other employer?

- *Severability* — Include a statement to the effect that should any part of the agreement be declared not to be legally binding, all other parts remain in force.

❑ Set out an agreement in writing and have both the employer and the employee sign and date it.

Refer to the Employment Agreement and its Guide in Chapter 2.2, *Sample Forms for the Management of the Practice*.

2.1.8 Quality Management



Canadian Handbook of Practice for Architects

2.1.8

Introduction
- Product vs. Service
- What is Quality?

Terminology
- Quality Management
- Quality Assurance
- Total Quality Management
- Management System Standards

Quality Management Systems in Architectural Practice
- Quality Management Systems for the Practice
- Quality Management Systems for the Project

Challenges of Quality Management
- Resistance to Change
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Quality Management Benefits

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Quality Management

Introduction

Any discussion of "quality" necessarily involves distinguishing between products and services. It could be said that the provision of quality services is synonymous with professionalism. Architects, like most other professionals, provide a "service."

Product vs. Service

It is important to distinguish between a "product" and a "service". Although architectural services usually contribute to the construction of a building (a product), the product of an architectural practice is not the building itself, but rather knowledge expressed in the form of drawings, renderings, reports and other "instruments of service". Unfortunately, clients sometimes do not have a proper understanding of this distinction and consider architectural services to be a commodity or product. When this occurs the potential value of architectural services is diminished.

A service is a set of singular and perishable benefits:

- delivered from the accountable service provider (*an architect*), mostly in close co-action with his service suppliers (*consultants*),
- generated by functions of technical systems and/or by distinct activities of individuals, respectively (*design and documentation*),
- commissioned according to the needs of his service consumers (*the building users*) by the service customer (*the client*) from the accountable service provider (*the architect*),
- rendered individually to an authorized service consumer at his dedicated request (*the client's representative*),
- and, finally, consumed and utilized by the requesting service consumer for executing and/or supporting his/her day-to-day business tasks or private activities (*for pricing and construction of a building*).

- Definition adapted from Wikipedia

In architecture, the service should be delivered in a competent, professional, and timely manner incorporating good skills in communication, planning and organization, and synergistic problem-solving.

What is Quality?

Although no universally accepted, clear or rigorous definition of quality exists, certain elements help to define quality as it relates to architectural services. These elements (adapted from the Standards Council of Canada) include:

- providing value to clients;
- doing the right things — right the first time, on time, all the time and to the client's satisfaction;
- fitness for purpose (offering solutions that fit the purpose);
- providing service which consistently meets or exceeds performance levels required by the client.

According to the International Organization for Standardization (ISO):

> *Quality is the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs*.

Long before the service sector of the economy took a strong interest in quality, manufacturing industries recognized the following principles:

- quality is determined to a much greater degree by management than it is by staff or workers;
- quality applies both to the product itself and the process of creating that product (service);

- the cost of avoiding mistakes is usually less than the cost of correcting them;
- quality must be planned, not simply inspected for;
- as quality goes up, some costs go down.

Quality can be achieved only when the services are delivered in a consistent, professional manner. Because of the diversity and complexity of architectural practice, the achievement of quality is an ongoing challenge. This chapter briefly discusses Quality Management within an architectural practice.

Terminology

Over the years, management consultants and standards-writing organizations have developed terms which relate to quality. Understanding this terminology is important.

Quality Management

Quality Management refers to what an architectural practice does to manage its processes and activities (the architectural services it delivers).

Quality Management is a systematic way of achieving quality at every stage of a process to ensure that the client's requirements are met on time and all the time. A small practice may have no "quality management system" as such, whereas a larger practice may have extensive written procedures, instructions, forms, and records — in other words, a system.

Quality Assurance

Quality Assurance is sometimes used incorrectly, and interchangeably, with "quality control." It can be defined as: all the planned and systematic activities implemented within the quality management system and demonstrated as needed to provide adequate confidence that an architectural practice will fulfil requirements for quality. For example, an architect's field review could be considered *"quality assurance"*; whereas, the builder's supervision could be considered *"quality control."*

The adoption of a quality management system provides **assurance** to clients and others that the **service** will be **consistent**. Currently, ISO 9000 certification is a mark of Quality Assurance. "Peer review" or some other form of verification may assist in quality assurance. A peer review is an independent, unbiased review — by a professional — which may examine:

- the policies and practices of the entire office;
- a single project, or design phase of a single project.

Total Quality Management

Total Quality Management (TQM) is a term originally used by the U.S. Navy to describe a Japanese-style of management which is based on the participation of all members of an organization in improving an organization's processes, products, services, and culture.

TQM includes the concepts of:

- continuous improvement;
- empowerment of staff;
- development of a program to prevent errors.

Management System Standards

Management System Standards, or "generic" management system standards, are standards which apply to any organization, large or small. They outline a "quality assurance model" to set up and operate a management system.

Management system standards are different from standards developed for physical products and processes, which are very technical and specific. For a description of these "technical" standards, refer to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*.

Quality Management Systems in Architectural Practice

Quality management for architects focuses on a process to ensure that professional services are consistent and continuously improving. This process will vary from practice to practice and from project to project. A good quality management system has the following objectives:

- ensure a common understanding of the service required and expected;

- ensure that the client receives the expected service and always remains satisfied;
- prevent errors in all aspects of architectural practice;
- prevent delivery delays;
- reduce the costs of architectural practice;
- increase productivity;
- continuously improve the reliability of services;
- meet all the quality assurance requirements agreed to by the client and the architect.

Implementing a quality management system requires the architect or managing principals to:

- seek work that falls within the expertise of the practice and its consultants;
- recruit, train, and retain staff who contribute to both their own individual success and the success of the practice;
- realize the potential of every staff member by providing consistent and creative work methods as well as opportunities for greater involvement;
- facilitate the staff's professional development;
- ensure that all staff participate in, and influence the quality of, service provided to clients;
- ensure that tasks to be performed and objectives to be achieved are understood, including how they affect quality;
- encourage contributions that enhance quality by giving due recognition and reward for achievement;
- assess periodically the factors that motivate personnel to provide quality service;
- use appropriate information technology and management methods;
- provide a work environment that fosters excellence;

The Royal Institute of British Architects (RIBA) recommends a two-tier approach to a quality management system:

- quality management for the practice;
- quality management for the project.

Quality Management Systems for the Practice

No matter how the practice is organized, ensuring the provision of quality architectural services requires that a number of strategic and administrative functions must be in place, including:

- a committed leadership;
- a mission statement and possibly also a "quality" statement;
- a clear organizational structure (refer also to Chapter 2.1.1, *Organization of an Architectural Practice*);
- a staffing plan and opportunities for professional development and empowerment (refer also to Chapter 2.1.7, *Human Resources*);
- an office manual on policies and procedures (refer also to Chapter 2.1.5, *Office Administration*);
- good document and data filing and retrieval systems (refer also to Chapter 2.1.5, *Office Administration*).

Quality Management Systems for the Project

The quality management system must be used for every project and for every phase of the project. This includes thorough project planning to ensure that services are delivered on time, accurately, and within budget.

Some architects become members of the Project Management Institute or PMI which has developed and perfected the practice of project management by identifying, defining, documenting generally accepted project management practices and a common project management lexicon. These PMI standards may help architects further their project management skills. More information can be found at *www.pmi.org*

Refer also to Chapter 2.3.1, *Management of the Project* and Chapter 2.1.9, *Risk Management and Professional Liability*. Prior to obtaining a commission it is important to have certain quality management procedures in place in order to determine which prospects to pursue, to screen potential clients, and to assist with contract negotiations. After a project is obtained, the following four activities must be considered in planning and implemention.

1. *Project Planning,* including:
   - design and construction schedule;
   - construction budget;
   - design requirements;
   - communications;
   - staffing requirements;
   - risk management;
   - method of construction project delivery;
   - project cost control.

2. *Project Definition*
   This is the pre-design or analysis stage of a project, used to determine quality requirements, including implied and stated needs. Ideally, these needs are described in a functional program provided by the client. (Refer also to Chapter 2.3.4, *Pre-design*.)

3. *Project Design and Documentation*
   The quality management system should be applied to all processes during the following project phases: schematic design, design development, and construction documents. (Refer also to Chapter 2.1.9, *Risk Management and Professional Liability*, which provides guidelines for checking documentation; Chapter 2.3.6, *Design Development*; Chapter 2.3.7, *Construction Documents — Drawings*; and Chapter 2.3.8, *Construction Documents — Specifications*.)

4. *Project Implementation*
   Quality management systems must also be applied throughout the construction process, including:
   - procurement (refer also to Chapter 2.3.9, *Construction Procurement*);
   - construction monitoring and control (refer also to Chapter 2.3.10, *Contract Administration — Office Functions*, and Chapter 2.3.11, *Contract Administration — Field Functions*);
   - close-out, commissioning, and and post-construction services (refer also to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations*).

Challenges of Quality Management

Many challenges must be overcome to implement a quality management system in an architectural practice.

Resistance to Change

Some claim that the greatest challenge to implementing a quality management system is due to human nature and our resistance to change the unique culture prevalent within any profession. The culture is influenced by the following realities:

- professionals are very diverse and individualistic;
- professionals require self-actualization and they need to feel in control of their destiny;
- professionals are creative and require an environment conducive to creativity.

These characteristics may contribute to a reluctance to adopt systematic quality management, because they:

- fear losing individual control over their work processes;
- perceive that such a system creates a work environment that stifles creativity;
- believe that a quality management system controls the design process.

Size of Architectural Practice

Because small practices have the advantage of being "tightly knit" firms with few staff to consult and train, one might assume that implementing a quality management system within such a firm would be easy. However, small firms often lack the financial resources and time to develop policies, procedures, and standard documents. In addition, client demands and cash flow may not provide management (often a sole proprietor) with adequate time to develop and implement a quality management system.

Larger architectural practices are usually able to dedicate more time and resources to quality management systems. Because of their size, larger firms may have had to establish certain policies and procedures. The greatest challenge for larger practices in implementing an effective quality management system is winning the acceptance of all staff including principals, who may have strong views on work processes and a strong need to control their careers and destinies.

The length of time required to achieve measurable results with a quality management system may seem excessive. Architectural practices focus on project work, and may find it difficult to get excited about — and make time for — the implementation of a quality management system. A quality management system should be regarded by staff as improving, not hindering, efficiency. Foresight and commitment are needed to realize of the benefits that can be derived from a quality management system.

Quality Management Benefits

Effective quality management systems do pay off in the following ways:

- improved service and client satisfaction;
- improved efficiency and effectiveness and ultimately higher profit margins;
- increased "marketability";
- greater "peace of mind" for principals dedicated to quality;
- improved processes and procedures which result in successful building projects;
- greater job satisfaction.

The greatest potential benefit of widespread implementation of quality management systems is an improved public perception of the architectural profession. Quality management can help to ensure that the services and the work of architects are respected and successfully transformed into buildings that improve the human condition. Smaller architectural practices may chose to develop a simple quality management system based on using the many Checklists found in this Canadian Handbook of Practice for Architects, whereas larger firms may elect to adopt a more complex quality management system such as ISO 9001 and become ISO certified.

ISO 9001

The International Organization for Standardization (ISO) has developed the 9000 series of standards for quality management. It consists of standards and guidelines relating to quality management systems and related supporting standards. Some of the benefits claimed by the ISO 9000 quality systems are:

- an internationally consistent set of standards;
- a single set of standards applicable to all industries;
- objective, third-party verification of quality assurance;
- opportunity for continuous improvement.

ISO 9001: 2008 provides a set of standardized requirements for a quality management system, regardless of what the organization does, its size, or whether it is in the private, or public sector. It is the only standard in the family against which organizations can be certified – although certification is not a compulsory requirement of the standard.

Once an architectural practice has instituted an ISO 9001 quality system, the practice may become registered by undergoing an audit conducted by a third-party certifier. Upon registration, the architectural practice can "market" itself as being "ISO Certified."

Definitions

Evaluation: Evaluation involves assessing the strengths and weaknesses of programs, policies, personnel, products, and organizations to improve their effectiveness.

Quality Assurance: All the planned and systematic activities implemented within the quality system and demonstrated as needed to provide adequate confidence that an architectural practice will fulfil requirements for quality.

Quality Control: Operational techniques and activities that are used to fulfil requirements for quality.

Total Quality Management: A management approach of an organization centred on quality, based on the participation of all of its members and aiming at long-term success through client satisfaction and benefits to all members of the organization and to society.

Verification: Confirmation by examination and provision of objective evidence that specified requirements have been fulfilled. [Note: verification typically deals with a "process," whereas validation is concerned with a "product."]

References

The American Institute of Architects (AIA). *The Architect's Handbook of Professional Practice – Fourteenth Edition*. Washington, D.C.: John Wiley & Sons, 2008.

Harrington, H. James and Dwayne D. Mathers. *ISO 9000 and Beyond: From Compliance to Performance Improvement*. New York, NY: McGraw-Hill, 1996.

International Organization for Standardization (ISO). Geneva, Switzerland.
www.iso.org/iso/home.htm

Johnson, Perry L. *ISO 9000: Meeting the International Standards*. New York, NY: McGraw-Hill, 1996.

Project Management Institute. *A Guide to the Project Management Body of Knowledge*. Third Edition. Project Management Institute, 2004.
www.pmi.org

Riddle, Dorothy I. *Quality Assurance in Services: An ISO-9000 Workbook for Small Professional Service Firms*. Ottawa, Ont.: Industry Canada, 1995.

Royal Architectural Institute of Canada (RAIC). *ISO 9000 and Your Practice*. RAIC Practice Builder. Ottawa, Ont.: RAIC.

Saylor, James H. *TQM Simplified: A Practical Guide*. Second edition. New York, NY: McGraw-Hill, 1996.

Shearer, Clive. *Practical Continuous Improvement for Professional Services*. American Society for Quality, 1994.

Stasiowski, Frank A. and David Burstein. *Total Quality Project Management for the Design Firm: How to improve quality, increase sales, and reduce costs*. New York, NY: John Wiley & Sons, 1994.

Stimson, William A. *Beyond ISO 9000: How to Sustain Quality in a Dynamic World*. Washington, D.C.: American Consulting Engineers Council, 1998.

Walton, Mary. *The Deming Management Method*. City: Putnam Publishing Group, 1988.

Williams, David J. *Planning a Quality Management Process for Architects & Engineers in Private Practice*. 1997.



2.1 Management of the Practice

2.1.9 Risk Management and Professional Liability

Canadian Handbook of Practice for Architects

2.1.9

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Risks Related to Management of the Practice
- Setting up a Practice
- Professional Liability Insurance
- Alternative Dispute Resolution (ADR)
- Records
- Getting Paid
- Stopping Work

Risks Related to Management of a Project
- Clients/Projects — GO NO-GO
- Assembling the Consulting Team
- Client-Architect Agreements
- The Project: Design and Documentation
- The Project: Bidding and Contract Award
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GO NO-GO Checklist to Assess the Degree of Risk

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Chart: Comparison of Statutes of Limitations in Each Province

Risk Management and Professional Liability

Introduction

Every business enterprise involves risk. Management of risk requires the identification of potential risks, an assessment of the degree of risk, a considered decision of whether or not to assume the risk, and, if the risk is assumed, what steps to take to mitigate any potential impacts.

Liability for professional services performed is one risk encountered by every architectural practice. Incorporated architectural practices (where permitted) can limit some of the liabilities for the business side of their operations. However, all architects are liable for the professional services they provide.

To a certain degree, risk management is the application of "common sense" and involves proper consideration of all the issues and their potential ramifications.

Risks occur throughout an architect's career, from setting up a practice, during the life of the practice, and after retirement. One can never totally eliminate risk. Inaction can sometimes be riskier than action, and either course can have unforeseen consequences.

This chapter cannot deal with every conceivable risk in an architect's practice,
but will review certain kinds of risks in order to assist the architect in developing a risk management strategy.

Risks Related to Management of the Practice

Setting up a Practice

Refer also to Chapter 2.1.1, *Organization of an Architectural Practice*, for further information on setting up a practice.

The architect should check the regulations of the provincial or territorial association of architects, particularly those requirements for:

- structure and ownership of an architectural practice;
- permitted names for an architectural practice;
- other operating requirements such as:
  - *bona fide* address;
  - telephone, etc.

In addition, the architect should confirm the following requirements of municipal authorities:

- business taxes;
- zoning or land use restrictions for the proposed office.

At the outset, the principals should prepare a "strategic plan" which includes a business and financial plan. Refer also to Chapter 2.1.4, *Financial Management*, and Chapter 2.1.1, *Organization of an Architectural Practice*, for more information on these plans.

Professional Liability Insurance

One method of mitigating risks is to obtain and maintain professional liability insurance (sometimes referred to as Errors and Omissions Insurance). This type of insurance is mandatory in some provinces. Refer to "Comparison of Provincial Provincial and Territorial Requirements regarding Professional Liability Insurance" in Chapter 1.1.4, *The Organization of the Profession in Canada*.

All architects are expected to perform their services to a "**professional standard of care**." This means that architects are required to provide service with the degree of care and skill that would be rendered by reasonably competent architects under the same circumstances and in the same geographic location. An architect who does not meet this standard may be found to be **negligent**.

An architect found liable for an honest error or omission or held to be negligent can be held personally accountable for the damages. Professional liability insurance provides protection from such claims and is intended to cover such liabilities.

A professional liability insurance policy does not necessarily afford total protection, because insurance policies typically have exclusion clauses which void coverage for certain specific activities. The architect should read and understand the policy and pay particular attention to exclusions. Premiums are usually proportionate to the volume of work in the practice. It may be necessary or prudent to purchase excess coverage over and above the basic level of protection required by the regulations or legislation of a particular province. If possible, the excess coverage should cover any exclusions in the primary policy. Excess insurance coverage for a specific project is typically a reimbursable expense.

The *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six* contains a clause, GC 7.2, limiting the architect's liability to the client. A similar clause should be included in all other non-standard, client-architect agreements. However, this clause will not limit exposure to third parties; therefore, additional coverage may still be advisable.

If a situation arises in which the architect believes that a claim might be made, the architect should discuss the situation with the professional liability insurer to minimize exposure. Notify the insurer at the first indication of the likelihood of a claim and follow the insurer's advice in order not to put the insurance coverage at risk.

Every province and territory has a different statute of limitations. These statutes of limitations usually provide a time limit when a claim can be made. These laws indicate the number of years after which no legal proceeding may be undertaken following a date when the damage (or negligent act) was discovered or ought to have been discovered. However, no time limitation applies to recognition of damage (or negligence) in the life of a building. In other words, professional responsibility and potential liability for each and every project remains with the architect for life.

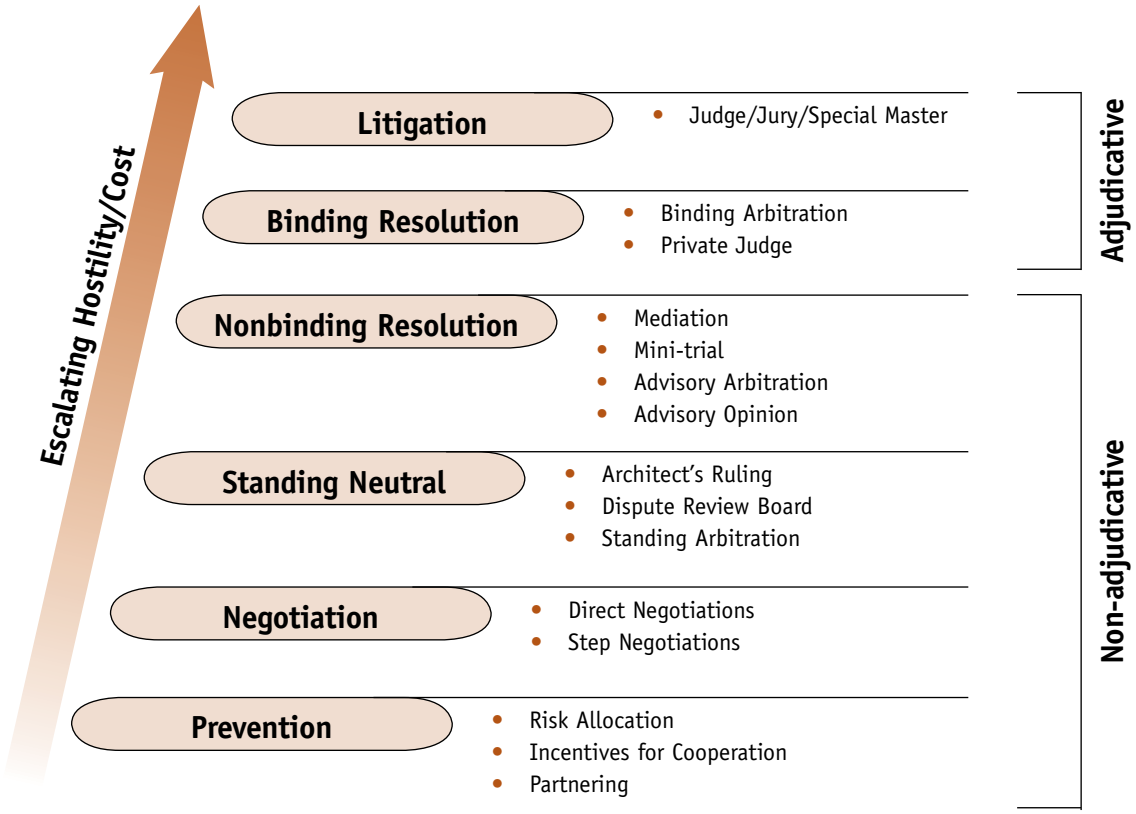
In Québec, the liability of architects is based in the following articles of the Civil Code:

Article 1457 — General Liability
Article 1458 — Contractual Liability
Article 2118 — One Year Liability for workmanship of a Contractor
Article 2120 — Five Year Liability in the case of loss of work — this is joint and severable with engineers and the contractor with the possibility of release.

Refer to the "Chart: Comparison of Statutes of Limitations in Each Province and Territory" at the end of this chapter.

The architect should always require sub-consultants to carry professional liability insurance with the appropriate coverage for each project. All consultants should be required to verify that they have obtained this coverage when the architect engages consultants for a project.

Illustration 1: Dispute Resolution Steps



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DPIC — Security Insurance Company of Hartford

Alternative Dispute Resolution (ADR)

In the event of a dispute, the architect may occasionally be requested to participate in some form of Alternative Dispute Resolution (ADR) such as mediation or arbitration. ADR is a conflict management strategy that seeks to avoid the very costly and very lengthy process of litigation. This approach is usually proposed when amicable negotiations do not achieve a mutual agreement to resolve a matter under dispute. Always discuss a proposal for ADR with your lawyer and the professional liability insurer prior to agreeing to participate. The insurer or their legal counsel may wish to represent the architect in these circumstances.

The ideal, of course, is to avoid disputes in the first place. Clear, concise, correct, well-coordinated, and well-checked contract documents will reduce the likelihood of a dispute, but cannot totally eliminate the possibility. Equally important, are regular and good communications with all members of the project team.

Illustration 1 shows a sequence of dispute resolution techniques. These methods of ADR are ranked in ascending order from low to high escalation of hostility and of costs for the parties in dispute.

Partnering

Developed as a method of **dispute avoidance**, partnering has the following objective: to solve problems as they arise, in a manner that will best achieve agreed-upon collective goals rather than trying to affix blame. Partnering involves a team comprised of owners, design professionals, and contractors (prime contractors and sub-contractors). Each participant in the process earns the trust, respect, and understanding of the others concerning the expectations, goals, and objectives in implementing a construction project. This is often accomplished through a facilitated working session or meeting. Partnering typically takes a few days of meetings which culminate in the issuance of a "charter" stating the mutual "buy-in" or acceptance by the partners to the project's common goals.

As with all contractual relationships, the "chemistry" among the participants must be compatible; partnering can enhance the chemistry but will not likely replace it.

Negotiation
In the event of a dispute, the parties may initially attempt to resolve the matter by negotiation. Negotiated settlements based on strict interpretation of the terms of a contract are generally less successful than those negotiations which focus on the underlying interests of the parties.

Mediation
When two or more parties mutually agree to refer their dispute to mediation, a neutral person is usually appointed to act as a mediator. The mediator is a type of facilitator, assisting the parties in their negotiations with one another to resolve or settle the dispute. The mediator:

- does not impose a settlement;
- is not a decision-maker;
- does not act as an expert providing an opinion.

Although the mediator does not need to have special expertise in the matter under dispute, some parties may believe that such expertise is useful.

Once a settlement is made, appropriate written documentation — which releases someone from an obligation or from further legal action — is necessary. These releases should be prepared by a lawyer.

Mediation is not usually successful unless both parties are willing to compromise.

Arbitration
In arbitration, two or more parties submit a dispute to an independent and impartial arbitrator or arbitration panel, mutually agreed upon by the parties in dispute. The arbitrator makes a final and binding determination in a judicial manner. The experience and qualifications required for an arbitrator are similar to those required for a judge. An arbitrator must have knowledge of:

- the law, in order to allocate liability between the parties in dispute and determine the amount of related damages;
- statutory procedures applicable to conducting a hearing;
- relevant legislation, relating to arbitration and judicial procedures.

Special expertise in the matter under dispute is not required, although this knowledge may be helpful. The parties must pay for the arbitrator or arbitration panel as well as the venue and other costs. As there are legal and professional liability insurance implications in arbitration whether participating as a witness or as a party; therefore, legal and insurance advice should always be obtained before agreeing to participate in any arbitration. Most professional liability insurers for architects prefer to avoid arbitration.

Records

Depending on the provincial statute of limitations or other regulations regarding an architect's archives, it may be necessary to store the large quantities of documentation, files, and drawings which a practice will accumulate over time. Accurate and comprehensive records can be invaluable when mounting a defence against a claim. Because a long period of time can elapse between the filing of records and the need for retrieval, it is important to establish a retrieval system that can be easily understood and accessed by the senior members of the practice.

"How long?" and "What type of documentation to keep?" remain a dilemma for most architects. Advice should be sought from a lawyer and the professional liability insurer. If the documentation is not copied onto paper then the architect should obtain electronic media that will endure and ensure that hardware and technology to access and read the information is available. Refer also to Chapter 2.1.5, *Office Administration*.

In some cases, long-established practices have had to defend against a claim related to a project designed and constructed before any of the current principals or staff were part of the practice. The records of these projects are the sole source of reference to the project and activities at the time.

Getting Paid

One of the risks an architect faces is a client who, for whatever reason, is delinquent in honouring a contractual obligation to pay invoices in a timely manner.

The following tips help to reduce the risk of late payment or non-payment of invoices:

- Obtain a retainer representing 5% to 10% of the total fee at the execution of the contract.
- Advise the client that the retainer will be applied against the final invoice. (Note: some architects are reluctant to request a retainer, although many architects do ask for and receive retainers on a regular basis. If the retainer is not requested, it is not likely that one will be offered. A retainer is especially important if the client is unknown to the architect or has a reputation for being difficult to collect from.)
- Ensure that the terms and conditions of the agreement have been discussed with the client, including the right to stop rendering services in the event of non-payment of fees.
- Issue invoices twice a month, every second week, or weekly, in some cases. (Although invoicing is typically a monthly operation, there is no obligation to be bound to a monthly policy. More frequent invoicing will not only improve cash flow, but will be an early alert of a delinquent payer. Using computer software for invoices can facilitate more frequent invoicing.)
- Include a statement of interest on overdue accounts. (Because an architectural practice is not a financial institution, the rate of interest should never be more attractive than that charged by those who fund projects. Even if there is no intention to charge and collect the interest, it should be included in the agreement and its impact on overdue accounts demonstrated in a statement of account.)
- Separate the fees for professional services from reimbursable expenses by using two separate invoices. (This may reduce the chances that the client may withhold payment of an invoice by questioning one or two small items.)
- Follow up invoices to certain clients with a telephone call, after an appropriate period of time, asking whether payment can be expected within the agreed-to time period. (Do not wait until the payment is overdue to make the call. Establish and implement a policy for a sequence of "reminder" calls, perhaps one week apart. Each call should be polite but firm, and after the first two calls, ask for a meeting if payment has not arrived by the due date.)
- Send a letter to the client outlining attempts to receive payment to date, if past-due payment has not been received after three weeks of calls and a meeting. The letter should state that at no time has the client expressed any problem with the invoices. Refer to the clause in the contract providing for the withholding of services for non-payment and express the wish not to have to invoke this, which could seriously affect the success of the project.
- Be aware of provincial lien legislation, particularly for different time limitations for filing a lien for a "contractor" (prime consultant) or "sub-contractor" (sub-consultant). Be prepared to initiate lien action within the time periods specified in the legislation.

Stopping Work

- Advise the client that non-payment or late payment is a serious matter and that services will be stopped if payment is not received and consider seeking legal advice before stopping services.
- Stop work if necessary — if services are not halted at the first instance, there will be no credibility if late payment should re-occur.
- Consider one or more of the following actions:
  - send a lawyer's letter to the client;
  - file a lien against the property (Refer also to Chapter 2.3.12, Take-over Procedures, Commissioning, and Post –Occupancy Evaluations);
  - attempt to reach an agreement through a mediation process;
  - attempt to reach a decision through an arbitration hearing;
  - turn the collection over to a reputable collection agency;
  - initiate legal action.

[Note: the final alternative to withholding services may be to resign the commission.]

- Notify the building department, whether or not the decision is to withhold services until payment is made, or to resign the commission. These Authorities rely on the architect to provide a general review of the project and in some jurisdictions, "letters of assurance" at the completion of a project.
- Be ready to prepare a defence against counter-claims by the client, whatever course of action is selected (mediation, arbitration, lien action or litigation). The client may make a variety of accusations, including poor performance and negligence.
- Take care not to issue idle threats: if legal action has been threatened for non-payment of an invoice by a certain date, be prepared to initiate the action on the following day.
- Record all communications regarding collection, including all attempts at contact for purposes of payment (faxes, E-mail, phone calls, letters, memos, conversations). These records will be important in formal hearings in resolving the matter of collection.

Risks Related to Management of a Project

Clients/Projects — GO NO-GO

Each prospective client and each prospective project should be considered in a similar fashion, whether the architect is:

- pursuing a specific sector of the market;
- responding to a request for proposal;
- entering a competition;
- negotiating with a single client for engagement of services.

This consideration includes a rigorous appraisal of the commission against a "GO NO-GO" checklist. Such a checklist identifies the risks involved if the architect decides to pursue the "opportunity." Many checklists have been developed by both large and small practices, and by management companies and financial advisors. Some checklists are short and others exhaustive. Some use a rating formula (for example, if 5 out of 20 questions score negatively, the project should not be pursued). Other checklists permit the architect to determine the degree of risk after answering all the questions. The architect should recognize that the honest answer to a number of questions may be "don't know."

There is a common misconception that the GO NO-GO analysis generates only one of two responses. However, the main function of the checklist is to identify which issues need to be changed in order to move from a NO-GO to a GO position, particularly if these issues are readily negotiable or can be corrected.

One of the hardest lessons for an architect to learn is when to decline a project opportunity. A proper GO NO-GO checklist and subsequent analysis can help make such a decision.

Each practice should devise its own GO NO-GO risk analysis process and use it rigorously prior to accepting a commission. The analysis can minimize the risks of accepting a commission under poor terms or conditions.

Refer to the "GO NO-GO Checklist to Assess the Degree of Risk" at the end of this chapter.

Assembling the Consulting Team

If the GO NO-GO checklist process leads to pursuit of the project, it will be necessary to minimize risk by assembling the proper consulting team. The architectural practice may need to hire additional staff, form a strategic alliance with another practice to become a sub-consultant, or form a joint venture with another practice. Each of these options requires careful consideration concerning:

- the competitive position of the practice;
- the performance of services in the event of success in being awarded the project.

Use the "Checklist: Issues to Consider When Assembling the Consulting Team," at the end of this chapter, to select the main engineering sub-consultants (structural, mechanical, and electrical engineers).

Even if the client plans to engage the consultants directly through separate agreements, the architect will usually be engaged to manage and coordinate their work; therefore, the above referenced checklist is still relevant.

It is also important to recognize the importance of team "chemistry." The success of a project

often depends on team chemistry, that is, the ability of all team members to work well together.
The use of the same consultants on a continuing basis may save the architect time, money, aggravation, and billable time, thereby improving overall quality, coordination, client satisfaction, and project profits. On the other hand, selecting new or different consultants for a specific project may put the architect in a better position to be awarded the commission, particularly if special expertise or client preferences are a consideration.

A written agreement should be prepared outlining the roles, expectations, and responsibilities as well as payment for each consultant. Avoid relying on past experience as the normal method of operating. Good relationships can be soured because of a lack of mutual understanding of routine items such as the scope of services, the number of site visits or the responsibility for the review of shop drawings. Nothing should be taken for granted. The use of the *Canadian Standard Form of Contract Between Architect and Consultant: RAIC Document Nine* is recommended.

Client-Architect Agreements

Good contracts always allocate risks fairly. It is not only professional, but also good business practice, to have a clear, written agreement which outlines the roles and responsibilities of both parties. The use of the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six* or *Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: RAIC Document Seven* is always recommended.

There is no reason to use a customized letter as a form of agreement in place of the Standard Forms of Agreement. Some architects argue that the standard forms of agreement will "intimidate the client." However, these same "timid" clients may have no difficulty in launching a lawsuit against the architect. Often, the lawsuit will be over the very issues covered in the "intimidating" standard form of agreement, but which are not included in the customized letter form of agreement which was executed. Oral agreements should **never** be used. The RAIC and most provincial associations of architects have a short form agreement to be used as an interim or "binder" agreement until a full standard form of agreement can be prepared and executed. The *Short Form Agreement Between Client and Architect – RAIC Document Eight* is available on the RAIC website for downloading.

One of the best ways of minimizing risk is to spend time with the client at the outset, carefully discussing the client-architect agreement, clause by clause, describing:

- what services will be provided;
- what the services entail;
- what will **not** be included in the agreement.

Architects must manage expectations as well as risks. Problems often occur later in the project because the expectations of the two parties differ. Early review of the agreement helps to avoid problems. Amendments to the standard forms of agreement should be included only if necessary, and if signed or initialled by both parties.

If the client is a corporation, ensure that the person signing the agreement for the client actually has the authority to commit the corporation. If in doubt, request a copy of the appropriate minutes of the board of directors meeting which confers such authorization on the individual.

Some corporate and institutional clients, particularly larger companies and some government departments, will prefer to use their own "standard agreement" forms instead of the *Canadian Standard Forms of Contract Between Client and Architect*. These agreements generally are written in favour of the client, often to the detriment of the architect's interests. Prior to executing such an agreement, the architect should review it carefully with legal counsel and with the professional liability insurer to ascertain the extent of risk that is being assumed over and above those risks in the standard forms of agreement.

Client-initiated variations to the standard forms of agreement often include the following phrases:

- *architect to warrant contractor's work;*
- *architect to assign copyright to client;*
- *client will not pay for reproduction of drawings;*

- *architect will supply a stipulated number of construction drawings and specifications;*
- *architect will guarantee building permit will be issued;*
- *architect will guarantee construction cost estimate;*
- *architect will guarantee LEED® certification;*
- *architect will visit site only when called by client;*
- *architect will engage surveyor, geotechnical engineer, and hazardous materials consultant.*

Certain clients say, "All other architects accept and sign this agreement, why won't you?". This statement is a "red flag," and the architect should seriously consider whether or not to assume such risks by signing the agreement. Consider the following:

- the statement is incorrect — "all other" architects do **not** sign such agreements;
- others may have signed against their better judgement and crossed their fingers hoping all goes well (all may indeed go well, but is it worth the gamble?);
- other architects have signed and have suffered the consequences or damages.

When such clauses are proposed, the prudent architect should:

- discuss the questionable clause with architects who have allegedly signed it;
- review the proposed agreement with legal counsel, the professional liability insurer, and the provincial architectural association;
- determine the extent to which the practice can be exposed to such risk;
- attempt to negotiate contract changes with the client.

Many clauses inserted in contracts not only increase the architect's liability but also are not covered by professional liability insurance. Examples include:

- warranty of performance;
- guarantee of conformity to code;
- guarantee the work of all others.

The architect should **never** warrant or guarantee any aspect of professional services.

When the architect is prepared to sign a contract with such adjustments and assume the subsequent risks, it is prudent to review the portions of the agreement that will be the responsibility of the sub-consultants and to obtain their concurrence **before executing the agreement** with the client. For example, sub-consultants may not be prepared to relinquish their copyright, even though the architect may be prepared to do so. These issues must be resolved prior to execution of the contract, or the architect will not be in a strong negotiating position after the agreement has been executed.

Many clients, in the interest of being, or appearing to be, environmentally conscientious, may request that their buildings meet, or be certified by, a sustainable building rating system, such as LEED®. The architect should never guarantee or warrant that a building will be certified. Such certification involves not only specific design elements but also construction procedures to be done by the builder, and certain operating and documentation standards by the owner, all of which are beyond the control of the architect. Furthermore, the certification is based on an assessment by an independent review agency and it is impossible to guarantee the agency's conclusion in advance. Finally, the architect must be a cautious to not promise unsubstantiated performance of sustainable design features, such as increased employee productivity or reduced employee turnover, which could result in a claim by a dissatisfied client.

The Project: Design and Documentation

The three main risks in the design and construction documentation phases of an architectural project are:

- the practice will lose money in producing the documents;
- the project will be over budget;
- an error or omission in the documents will result in a claim.

Note: As of 2009, there is no significant history in the use of Building Information Modeling or BIM, many of its proponents claim that these new documentation and modeling techniques will reduce conflicts between design elements, result in better coordination of construction documents, and therefore reduce claims. There now exist new forms of contract produced by the American Institute of Architects to accommodate projects using Integrated Project Delivery with

BIM, as well as Building Information Modeling Protocols or appendices to accompany standard client-architect agreements. It is premature to assess the legal consequences of these forms of contract and architects should review these types of contracts with their lawyer.

Consider the following issues in managing risks related to design and documentation:

Composition of the Design Team
The "chemistry" among the various people on the project may require re-assessment. (Consider changing the personnel if working relationships are not harmonious.)

Professional Fees
If the fees for a particular project are not commensurate with the professional services required, the architect should attempt to renegotiate. If the fees cannot be re-negotiated, the experience and "lessons learned" should be taken into consideration when calculating fees on future projects. In any event, **the professional services must not be compromised**. Do not assume that the loss will be offset by gains during the contract administration phase; surveys indicate clearly that profits during contract administration are generally only 50% of profits in the earlier phases of a project.

As mentioned above, the fee must always be commensurate with the scope of services required for the project. Refer to *Mastering the Business of Architecture* (outside Ontario, called *Mastering the Business of Design)*. This publication itemizes services that the architect can provide. The client and the architect can jointly use the publication to select the services required for a specific project, following which the two parties can readily establish and agree upon an appropriate fee.

Refer also to the RAIC document, *A Guide to Determining Appropriate Fees for the Services of an Architect*.

Method of Project Delivery
There are several methods of project delivery and each has unique risks for the architect.

Refer also to Chapter 2.3.2, T*ypes of Construction Project Delivery*.

It is critical that the role of the architect and the scope of services for each project delivery method is clearly understood and that the correct form of contract is used. Architects should consult their lawyer and professional liability insurers about any contracts when they are considering entering into an agreement for a method of project delivery for which they are not familiar.
Some governments are using new forms of project delivery such as Public–Private Partnerships or "P3s" to transfer some risks to the private sector (there is different terminology in various jurisdictions for this form of project delivery). As most P3 projects are usually very significant and the stakes very high, all architects are advised to ensure that all professional service contracts for P3 projects are developed and reviewed by their lawyers and professional liability insurers.

Project Management
Use some form of project planning to track actual costs (time and expenses) against those anticipated. This information can provide historical data and to assist in future project planning such as assignment of personnel.
A number of software programs are available to facilitate the management process.

Refer also to Chapter 2.3.1, *Management of the Project*, and to the Appendices in Chapter 2.3.2, *Types of Construction Project Delivery*.

Checklists
One of the most important elements in the management of risk is a thorough and comprehensive checking process. Unfortunately, this is often rushed or omitted due to inadequate scheduling or unreasonable deadlines. **This element may be the singular most important one in mitigating the risk of incomplete, incorrect, non-comprehensive or uncoordinated documents**. Many practices develop and use exhaustive checklists to ensure that the many items required to complete a set of drawings have been included.

A proper checking process is highly disciplined and should be followed rigorously. A simple method is to apply — *without exception* — the rule that the drawings and specifications are not to be sealed until after the checking process has

been completed.
For other checklists, refer to "Checklist for the Management of the Architectural Project" in Chapter 2.3.1, *Management of the Project*, and to the references in Chapter 2.3.7, *Construction Documents — Drawings*.
Someone other than the originator (designer or CAD technician) should check drawings. Once the documents are assembled for checking, consider using a colour-coded checking process for printed checksets as follows:

- *Step 1*: Check all notes and dimensions. Use a yellow line to cover the agreed-to or correct items, circle incorrect items with a red line, and place the corrected item or information next to the red circle.
- *Step 2*: After the "red-lined" information is corrected, draw a green line over the item on the marked-up print immediately after the correction is made on the original. The individual who did the original checking with red and yellow lines should be the same one to review the corrected original against the red-lined version to confirm that all corrections have in fact been made.
- *Step 3*: Upon confirmation, a heavy black line is then drawn across the green line on the marked-up print. The checking process is not complete until every print is fully marked with yellow for correct items and red-plus-green-plus-black for items requiring correction.

This process — known as "back checking" — is not complete until the back checker signs off on each print. Only after "sign off" are the documents ready for seal and signature, and not before.

Checking to this extent is time-consuming. However, such a rigorous check will avert problems later on, when they are much costlier to correct. All architects should allocate and budget appropriate time for this aspect of risk and quality management.

The Project: Bidding and Contract Award

The risk of litigation by unsuccessful bidders can be minimized by using clear and concise criteria setting out the method of contractor selection, and adhering strictly to these criteria. The architect should use standard bid documents and become familiar with CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts*.

All privilege clauses in the bid documents — such as *"The lowest or any bid may not necessarily be accepted"* — should be reviewed and written based on based on Section 2.0, The Principles of the Law of Competitive Bidding in CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts*.

A decision to award the contract to other than the lowest *bona fide* bidder can cause legal action. To minimize this risk, the architect should advise the client to obtain legal advice respecting any award to other than the lowest bidder.

The Project: Contract Administration

This phase of the project is prone to many risks which expose the architect to potential claims. Refer also to Chapter 2.3.11, *Contract Administration — Field Functions*, for more detailed information. The architect can reduce these risks by rigidly adhering to standard routines, forms, and policies. Some of these include:

- pre-construction meeting procedures;
- a pre-packaged kit for field reviews;
- proper safety equipment;
- a checklist for field review;
- pre-determined format for field review reports;
- pre-set notes of site meetings;
- timely response to all contractor requests, to avoid potential delays;
- timely review and processing of all shop drawings, samples or mock-ups;
- recognition and understanding of the roles of all participants in the project (avoid assuming issues or problems that do not fall within the architect's scope of work, otherwise the contractor will readily assign responsibility to the architect);
- adequate assessment of the contractor's application for payment (experienced

contract administrators will review the application with the contractor on the site before the application is finalized by the contractor);
- care in issuing the Certificate of Substantial Performance (once issued, these documents cannot be rescinded and they activate the timing for the release of holdback);
- impartiality between the client and the contractor;
- documentation of all communications, findings, and observations, in part to support future defence of any claim.

The Project: Post-construction

Most client-architect agreements provide for the termination of the agreement one year following the date of substantial performance. The architect should maintain contact with the owner and should bring critical or annoying warranty items to the contractor's attention promptly for rectification. Provide a list of warranty items for correction by the contractor, following a final on-site review scheduled shortly before expiry of the warranty period. Ensure that the critical date is logged in calendars or in a "bring-forward" system to avoid the risk of missing this final field review prior to the expiration of the warranty period. Refer also to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations*.

Projects in Other Jurisdictions

Architects working outside their base jurisdictions should learn about the differences in construction practices and professional services in other jurisdictions which may increase risks. The further from home, the greater the differences. Some differences to watch for include:

In other municipalities within the same province:

- different zoning, land-use, and other bylaws;
- different building code interpretation;
- different processes in applications to Authorities Having Jurisdiction;
- local customs.

In other provinces within Canada:

- different legislation (such as lien legislation);
- architectural registration/licensing and provincial policy with respect to seeking work in another province without a licence;
- applicable provincial law (for example: Civil Code in Québec vs. common law in other provinces);
- local customs;
- bylaws in specific municipalities.

Outside Canada:

- different laws:
  - whether the architect can legally provide services in the jurisdiction;
  - liability laws;
  - tax laws which may affect profitability;
  - laws respecting travel, visas, and freedom of movement;
  - international agreements and treaties;
  - applicable building codes;
- different customs:
  - cultural differences;
  - language which may govern contracts;
  - payments to "sponsors" for the privilege of working in the jurisdiction;
  - political alliances (allies, neutral parties, and enemies);
  - local trade practices;
- forms of contract:
  - standard international contracts, for example, the contract of the International Federation of Consulting Engineers (FIDIC);
  - uninsurable clauses such as guarantees, warranties, higher standards of performance than in Canada, greater indemnification of owner than Canadian architects are accustomed to (for example, the following are not insurable: major disasters, a major settlement of a lawsuit several years after project completion);
  - unusual clauses (for example: "if there is a discrepancy in the documents that which best suits the client will govern");
- payment:
  - make payment terms very clear;
  - be aware of exchange rate fluctuations if payment will be in a foreign currency;
  - make arrangements for transfer of funds before accepting the commission because many countries forbid local currency leaving the country;

    - be aware that some foreign jurisdictions require fees to be either held for performance holdbacks or guaranteed by letter of credit;
- other differences:
    - different time zones between the main office and the overseas location mean that there may be little or no time in which both offices are operating simultaneously;
    - increased communication costs;
    - collaboration — many foreign clients want to deal with a firm that has a strong local presence; this could entail an alliance with a foreign architectural practice, or the opening of an office in the jurisdiction, either of which will require review of the architect's status with both local and foreign associations, as well as with the professional liability insurer.

Definitions

Indemnification: Where one party agrees to pay certain damages or losses incurred by another party.

Liable: Legally bound; subject to penalty; under obligation to do; exposed or open to suffer something undesirable. (adapted from the *Oxford Dictionary*)

Risk: A chance or possibility of danger, loss, injury or other adverse consequences. (adapted from the *Oxford Dictionary*)

References

American Institute of Architects. Washington, D.C.
AIA Risk Management Resource Center
www.aia.org/pm_news_riskmgmt

Atkins, James B. and Grant A. Simpson. *Managing Project Risk: Best Practices for Architects and Related Professionals*. John Wiley & Sons, Inc., 2008.

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.
www.ccdc.org

CCDC Bulletins, notably:

Partnering. November 1998.

Alternate dispute resolution (ADR) processes. November 1998.

Consultant's role in ADR processes. November 1998.
Use of Supplementary Conditions with CCDC Standard Contract Forms. November 1998

ENCON Group Inc.
Loss Control Bulletins for Architects and Engineers
www.encon.ca/english/resources/losscontrolinformation/bulletins/pages/default.aspx

Ontario Association of Architects. Toronto.
www.oaa.on.ca/client/oaa/OAAHome.nsf/web/OAA+Practice+Bulletins!OpenDocument

Practice Bulletins, notably B Series — "Good Practice"

ProDemnity Insurance Company. Toronto.
www.oaa.on.ca/client/oaa/OAAHome.nsf/web/Pro-Demnity+Insurance?OpenDocument

ProDemnity Policy No. 1, 2, 3 and 4

Ordre des Architectes du Québec. Montréal.

Articles du Code civil d'intérêt particulier pour les architectes. 1993.

Articles of the Civil Code of Particular Interest to Architects. 1993.

Royal Architectural Institute of Canada (RAIC).

Guide to Using Consultants. RAIC Practice Builder. Ottawa, Ont.: RAIC.

Building Information Modeling (BIM). RAIC Practice Builder. Ottawa, Ont.: RAIC.

A Guide to Determining Appropriate Fees for the Services of an Architect. Ottawa, Ont.: RAIC.

Stone, David A.

Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives Inc., 1999.

Appendix A — Record Keeping

Introduction

The most valuable advice for managing any project that can be given to an architect is "*put it in writing*".

This statement applies equally to:
formal documentation used in the administration of a construction contract;
other forms of communication between the architect and client, subconsultants, manufacturers' representatives, Authorities Having Jurisdiction, bidders, general contractors and testing and inspection agencies.

Accurate, comprehensive records of all communications with everyone with whom the architect discusses any aspect of the project must be made and kept in a readily-retrievable filing system. A sample system is given in the Chart: A Project Filing Format, in Chapter 2.1.5, *Office Administration*. This may be adapted to suit the needs of each individual architectural practice.

Means of Communication

contractual:
Prequalification Advertisement as required
Prequalification Submissions as required
Bid Advertisement(s)
CCDC 11, Contractor's Qualification Statement as required
Bid Closing Date Extension Announcement as required
Addenda
Bids
Construction Contract
Supplemental Instructions
Change Orders
Change Directives
Certificates for Payment

other hard copy documents:
letters
memos
minutes of meetings:
these may be face-to-face meetings, telephone conference calls or video conferencing; in all cases, minutes are taken and issued, preferably within 48 hours of meeting, to all participants and other interested parties.

frequently hand-written:
transmittals for documents or for faxes.
memos
site instructions
desk diary

electronic:
faxes:-documents transmitted by fax remain in the office of origin and should be refiled with the fax transmittal attached or, a notation on the document stating that it was faxed, giving the date, time and recipient(s); received faxes may be printed automatically in hard copy or held in fax machine until printed in hard copy or downloaded to an electronic file.
e-mails

oral:
voice mail
face-to-face communications
telephone

Record Keeping

Record everything in writing, **dated** and filed in an orderly, readily-retrievable system.

In specific circumstances, the **time** a document is issued or received may also be significant, such as: issuing the last addendum just prior to the deadline identified in the Instructions to Bidders; receiving bids at the architect's office;

Most fax machines and e-mail automatically record the time; however, if hand-written transmittals are used, time of issue or pickup should be recorded. A request for acknowledgment may be desirable for key issues.

Concise, written summaries of all voice mail messages, telephone and face-to-face conversations should be prepared as soon as possible and filed.

For ease of retrieval, use the same filing system format for hard-copy and electronic material. Generally, every e-mail sent or received should be filed. The only exception might be a series of e-mail exchanges leading up to a conclusion/instruction/confirmation. In this case only, it may be logical to retain only the original enquiry and the final resolution; if there is any doubt about whether an intermediate e-mail might become relevant in future, keep it.

Electronic records are more vulnerable to loss than hard-copy, therefore it is essential that backup files are routinely and rigorously created, preferably each time a document is created or received. Make duplicate backup files and store them off-site.

GO NO-GO Checklist to Assess the Degree of Risk

Issue	Yes	No	Don't Know	Comment
A. Adherence to Marketing Plan				
1) Does the project meet our design objectives/goals?				
2) Does the project match our target markets as defined in our marketing and business plan?				
3) Does the project match our target services?				
4) Is the project within our geographic reach?				
5) Is the project consistent with our minimum/maximum project size objectives?				
6) Does the project present us with an unusual opportunity to break into a new market that we had not foreseen?				
7) Does the project offer repeat client potentials?				
8) If we get this job, will it preclude us from further work with this client?				
B. Profit Potential				
1) Can we make a profit doing this job?				
2) Are there any prevailing reasons to want the job, even though we cannot make money on it?				
C. Project Financing				
1) Are project funds secured?				
2) Is it likely they will be?				
3) If not, will funds be secured before we complete working drawings?				
4) Is the client experienced or inexperienced in contracting design services?				
5) Is there a discrepancy between the proposed scope of services and the fee?				
6) Is the fee adequate?				
7) Can we propose a competitive fee?				
8) Are there other factors that negatively affect the project's viability?				
9) Is the client's financial and general reputation good?				
10) Is the project free of speculative aspects?				
D. Architect Selection Process				
1) Is the selection process reasonable?				
2) Is the job "wired" to another firm?				
3) Can we compete effectively under the conditions of the selection process?				

Issue	Yes	No	Don't Know	Comment
E. Location				
1) Is our location favourable in terms of the client's criteria?				
F. Human Resources				
1) Do we have the available human resources to produce the work in the client's time frame?				
G. Marketing / Staff				
1) Do we have the staff and time available to pursue this project in a first-class fashion?				
H. Client Contact				
1) Are we known by the client?				
2) Is it a past client with whom we have had a good reputation?				
3) Have we become known to the prospect?				
4) Will we have adequate opportunity to research the client's needs before the marketing process begins?				
5) Do we have any inside tracks with the primary decision-maker?				
6) Do we have any inside tracks with others who are or may be influential in the decision?				
I. Competition				
1) Do we know the likely competition? (identify)				
2) Do we have a chance against them?				
3) Does this project offer us an opportunity to compete at a "higher level" against firms with whom we would like to be identified in the marketplace?				
J. Message				
1) Do we have a strong message?				
2) Are we uniquely qualified to do the job? (identify)				
3) Can we compete effectively?				
K. Making the Short List				
1) Are our odds of being shortlisted good? (explain)				
2) Are our odds good if/when we make the shortlist? (explain)				
L. Cost to Pursue				
1) Will marketing time and effort required be in proportion to our odds?				
2) Will the marketing costs be relative to the potential profit? (Spending our profit to get the job may be sufficient reason to decline.)				
M. Other				
1) Are there specific requirements that we will have difficulty in accommodating? Such as:				
a) Insurance requirements?				
b) Copyright assignment?				
c) Engagement of specialty consultants?				
d) Guarantees?				

Checklist: Issues to Consider When Assembling the Consulting Team

Issue	Yes	No	Don't Know	Comment
1. Are the professionals with previous relevant experience still with the engineering consulting firm, and will they be assigned to this project?				
2. Does the client know the proposed engineering consultant?				
3. Will the client object to the use of this consultant?				
4. Does the consultant have experience in this project type and this client type?				
5. Does the consultant have prior working experience with your practice?				
6. Does this consultant have prior working experience with the other proposed consultants?				
7. Was prior working experience with this consultant positive?				
8. Is the consultant's proposed fee competitive?				
9. Does the consultant have any conflicts of interest on this project or with this client — either actual or perceived?				
10. Do the consultants all carry professional liability insurance to the limits required for this project?				

Chart: Comparison of Statutes of Limitations in Each Province and Territory

The limitation period to bring an action relating to negligent architectural services varies from province to province and with the type of damage that results. The basic rule is that the limitation period starts to run from the date the cause of action arose. Usually, this occurs when the party suffering the loss discovers, or ought to have discovered, that it had the right to sue for damages and knows the identity of the person/entity it can sue. The damage may not be discovered for many years after the construction is complete (for example, precast concrete panels may fall off after incorrectly specified anchors have rusted or corroded and failed).

The following chart sets out the appropriate limitation periods according to whether the action is one in contract or tort (that is, negligence) and whether the damage is to property or person.

This is a very general outline only and does not replace proper advice, from professional liability insurers and lawyers, which should be obtained as soon as possible in the event of a potential claim.

Province	Limitation Period (Number of Years)	Relevant Legislation
British Columbia	• Negligent design and/or construction or breach of contract causing damage or injury to person or to property: 2 years • Time will be postponed if the action is for fraud or breach of trust	*Limitations Act,* R.S.B.C. 1996 ss.3(2)(a), (5), 6(3)
Alberta	• Negligent design and/or construction and breach of contract - 2 years after the date on which the claimant knew, or in the circumstances ought to have known of the claim; or -10 years after the claim arose; whichever period expires first.	*Limitations Act,* R.S.A. R.S.A. 2000, c.L-12, s.3.
Saskatchewan	• Negligent design and/or construction: 2 years causing injury to a person: 2 years • Breach of contract: 2 years	*The Limitations Act,* Chapter L-16.1 of *The Statutes of Saskatchewan*, 2004 (effective May 1, 2005), as amended by the *Statutes* of Saskatchewan, 2007, c.28.
Manitoba	• Negligent design and/or construction causing: Injury to real property: 6 years Injury to personal property: 2 years Injury to a person: 2 years • Breach of contract: 6 years	*Limitations of Actions Act,* L.R.M. 1987, s.2(1)(f),(g),(i),(n)
Ontario	• Negligent design and/or construction: 2 years • Breach of contract: 2 years • 15 years is the ultimate limitation period (Schedule B S15(2)) for both negligent design or breach of contract.	*Limitations Act,* 2002, S.O. 2002
Québec	• Negligent design and/or construction: if the work was completed: 8 years if not completed: 3 years • Breach of contract: 3 years	*Civil Code of Quebec* Art. 2925, 2118
New Brunswick	• Negligent design and/or construction: 6 years • Breach of contract: 6 years	*Limitation of Actions Act,* S.N. 1997, c.L8, s.9
Nova Scotia	• Negligent design and/or construction: 6 years • Breach of contract: 6 years	*Limitations of Actions Act,* R.S.N.S. 1989, c.258, s.2(1)(e)
Prince Edward Island	• Negligent design and/or construction: 2 years • Breach of contract: 6 years	*Architects Act,* S.P.E.I. 1990, c.4, s.34 & *Statute of Limitations Act,* R.S.P.E.I., 1988, c.S-7, s.2(1)(g)
Newfoundland and Labrador	Breach of contract and/or professional negligence in design and/or construction causing injury to person or property: 2 years; -other breaches of contract: 6 years	*Limitations Act,* S.N.L. 1995, c. L-16.1, ss, 5(a), 6(1)9c), 9
Northwest Territories	• Negligent design and/or construction causing: Injury to real property: 6 years; Injury to personal property: 6 years; Injury to a person: 2 years	*Limitation of Action Act* R.S.N.W.T. 1988,c.8(Supp.) In force July 19, 1993; SI-008-93



2.1 Management of the Practice

2.1.10 Architectural Services and Fees

Canadian Handbook of Practice for Architects

Introduction

The Architect's Traditional Services
- Basic and Additional Services
- Identification of Services

The Architect's Fee
- Methods of Compensation
- Fee Calculation

Trends in Architectural Services
- Requests For Proposals

Client-Architect Agreements

Definitions

References

Appendix A – the Architect as Expert Witness

Checklist: Scope of Services

Checklist: Supplemental Architectural Services

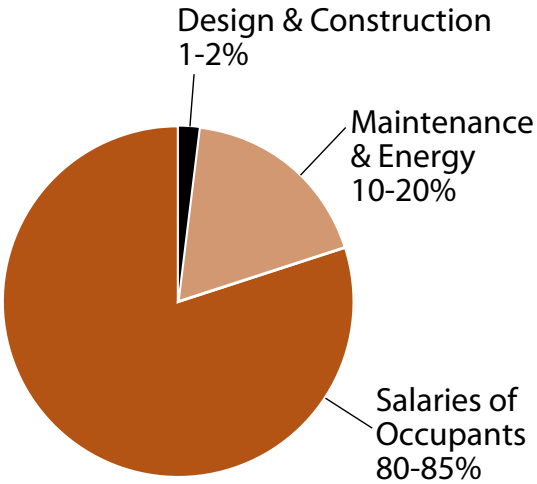
Architectural Services and Fees

Introduction

Architecture is a rapidly changing, knowledge-based, service industry. As a result, providing and determining compensation for architectural services is more challenging than ever. This chapter will help architects meet the challenge by discussing how to identify appropriate services for their clients and how to set a value for those services.

Architects need to educate clients about the value of architectural services and how an architect's ideas and knowledge can result in significant increases to the real estate or commercial value of a building as well as savings in the building's operating and maintenance costs. Refer to Illustration 1 which illustrates that the architect's fees are indeed a very small fraction of the total costs for constructing and owning a building. This important upfront investment in professional services can have very significant impacts on future costs.

Illustration 1: Costs of Constructing, Owning and Operating a Building



The Architect's Traditional Services

Before an agreement (or interim agreement) is prepared and before beginning work on a project, the architect must propose an appropriate complement of services to the prospective client. The services should be based on the project requirements, the client's own in-house competencies and the architect's capabilities. Because the architect is required to provide an appropriate level of professional services, fees must be adequate to enable and ensure that this level is maintained.

Basic and Additional Services

Traditionally, architectural services were limited to the design and construction administration of buildings, a fact reflected in the following five sequential phases of a project:

- Schematic Design;
- Design Development;
- Construction Documents;
- Bidding and Negotiation;
- Construction Phase (Contract Administration).

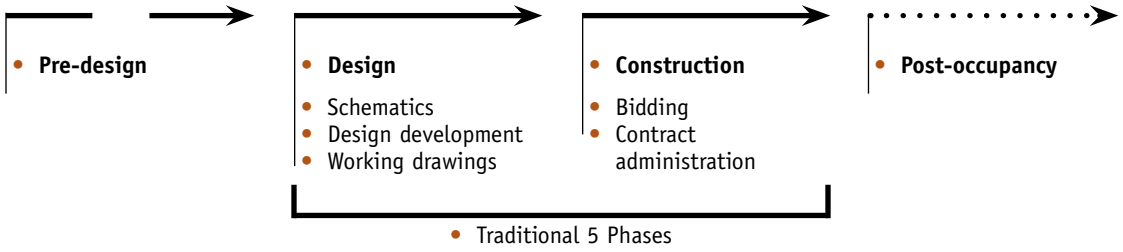
Refer to the *Canadian Standard Form of Agreement Between Client and Architect: Document Six* and to several of the chapters in Section 2.3, *Management of the Project*, for a full outline of architectural services contemplated for each phase.

These five phases have become so entrenched that they are used in all of the Canadian standard forms of agreement between the client and the architect.

Basic services are those services the client and the architect have agreed are necessary for the implementation of the project.

These services, organized by project phase, are listed in the "Checklist: Scope of Services" at the end of this chapter.

Illustration 2: Linear ("Basic Services") View



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The profession is aware that many clients require additional services beyond the basic services and, in a few circumstances, certain clients may not require parts of the traditional "basic" services. This has resulted in a larger menu of services described in the various schedules attached to the standard client-architect agreements.

Refer to the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six* and to several of the chapters in Section 2.3, Management of the Project, for a full outline of architectural services contemplated for each phase.

Additional services (as defined in the Definitions and General Conditions of RAIC Document Six) are:

> "those professional services which are not contemplated at the time of execution of the contract and therefore cannot be identified then as being included in the contract but which with the written consent of the Client and Architect are subsequently added to, or which adjust, the scheduled scope of services outlined in the schedule(s) listed in the contract."

Fees for additional services are frequently invoiced on the basis of agreed hourly rates.

Understanding the full breadth and value of services that could benefit a client can create opportunities for additional and supplemental services on a project, and identify new markets.

The Checklist: Supplemental Architectural Services at the end of this chapter identifies many types of services that cover a broad range of expertise and activity — such as providing financial feasibility studies, business cases and preparing functional programs, submissions to authorities, and life cycle cost studies. Clients are often unaware of, or choose to ignore, the distinction between traditional architectural services and other related professional work. Architects who also ignore this distinction may not be receiving full value for their efforts, and may be providing additional services on a *pro bono* basis for a significant segment of their market.

Practices may wish to prepare a briefing document to outline the types of services for which the firm has expertise that can be supplied to prospective clients.

Identification of Services

The success of a project depends on the proper identification of services. At the outset, the architect — together with the client — must determine the professional services required for the project. Once this is done, the architect can prepare a proposal of fees and services and negotiate an agreement with the client.

Occasionally, the required services cannot be identified at the outset of the project. For example, the site may not be selected, or a functional program may not have been prepared. In these instances, it is prudent to work on a per diem basis, until the project is better defined.

To identify required services, prepare a list of tasks to be performed and a time frame for each. The process also involves identifying and selecting engineers and other consultants necessary for the project. The services outlined in the standard forms of agreement can serve as a checklist or "menu" for selecting the appropriate services.

The Architect's Fee

In addition to the RAIC document, *A Guideline to Determining Appropriate Fees for the Services of an Architect*, the architect should obtain the latest fee schedule, tariff of fees, and conditions of engagement from the appropriate provincial or territorial association of architects.

See the References section of this chapter for a list of these documents.

Methods of Compensation

Both parties — architect and client — will benefit if the architect receives adequate compensation for the professional services provided. Compensation is usually by one of the following methods:

- percentage (of the construction cost);
- time basis (per diem or hourly rates);
- lump sum (or fixed fee); or
- any combination of the above.

Occasionally, in some provinces, architects are paid on a unit basis for projects such as multiple-unit housing or hotels, which have a repetitive element. Unit fee determinations are frequently arbitrary and do not relate to the nature and scope of architectural services.

The standard forms of contract have been crafted to accept different approaches to compensation. *Construction cost* has been clearly defined in the agreements. Fees should never be confused with *reimbursable expenses* (sometimes called disbursements) which are also clearly defined in the agreements.

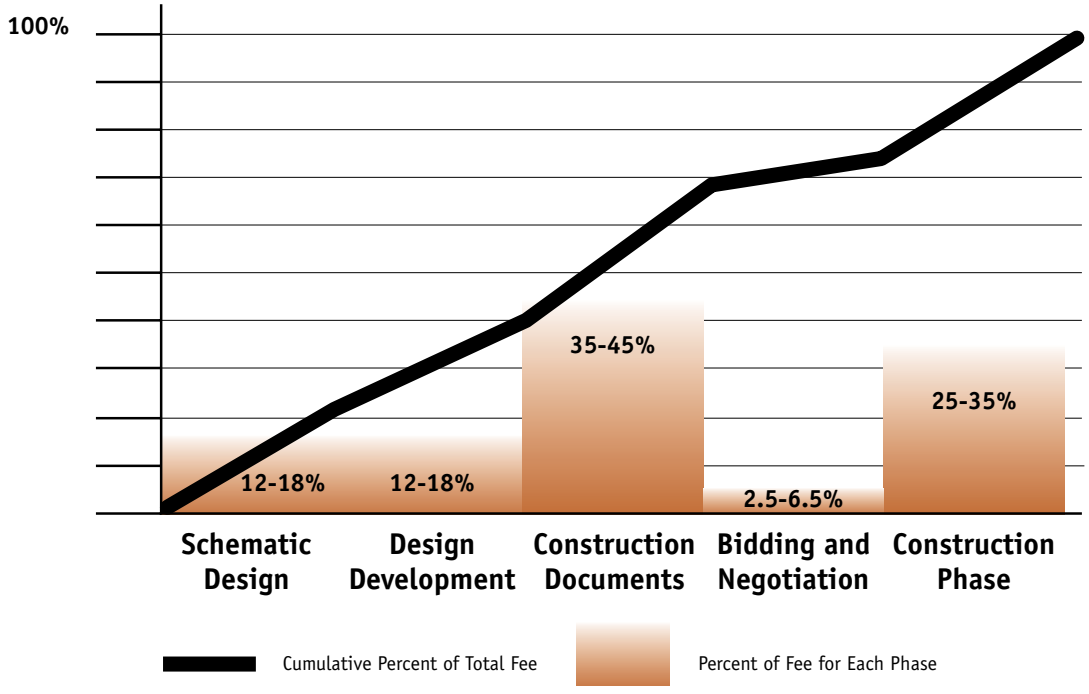
Fee Calculation

Refer also to Chapter 2.1.4, *Financial Management*.

When calculating the distribution of the fee over the traditional five phases of a project, the following breakdown is typical:

Phase	% of total fee
Schematic Design	12-18
Design Development	12-18
Construction Documents	35-45
Bidding and Negotiation	2.5-6.5
Construction Phase (Contract Administration)	25-35

Illustration 3: Typical Allocation of Fees for a "Traditional" Architectural Project



In new forms of project design and documentation, such as Building Information Modeling or BIM, more design and documentation is completed during the earlier phases of a project. As a result it is not uncommon for the phased breakdown of fees on projects using BIM to resemble the following:

Schematic Design	25% of the fee
Design Development	25% of the fee
Construction Documentation	25% of the fee.

Typically, services are rendered and payments are made progressively, with final accounting (100% of total fee) at Substantial Performance of the construction or after the preparation of the final Certificate for Payment to the contractor.

The three usual methods of compensation use the following methods of fee calculation:

Percentage of the Construction Cost
Architects should base their fees on the recommended schedules prepared by the RAIC in *A Guideline to Determining Appropriate Fees for the Services of an Architect*, or schedules developed by the provincial or territorial associations of architects. Obtain the most current schedule available, as they are occasionally updated.

Percentage fees are, to a certain extent, contingent on the size and type of project as well as the scope of services required. For example, the schedules generally recommend:

- lower percentages for simple buildings or buildings with a higher construction cost;
- higher percentages for buildings which are more complex or have a lower construction cost.

The percentage fee provides a base fee, which must be adjusted depending on the scope of services and other fee adjustment factors outlined in A *Guideline to Determining Appropriate Fees for the Services of an Architect*. By applying the fee to a known cost or approved estimate at the start of each project phase, the fee can be accurately determined and both the client and the architect can budget accordingly.

The recommended base percentage fees anticipate the following project conditions:

- the architect is providing full, basic services (traditional approach);
- the project is a unique, one of a kind design for a single client who can clearly define the function and scope;
- approvals from Authorities Having Jurisdiction are relatively straight forward;
- the project will be tendered once, as a single, coordinated package of construction documents;
- the method of project delivery is the use of a Stipulated Sum Contract (such as CCDC 2);
- the project size is not extreme (neither very large nor very small);
- the project approvals are simple and straightforward;
- consultants are limited to those providing the three basic engineering services;
- there are no delays, or the progress of the project is not intermittent (thereby incurring repetitive "start-up" costs);
- the percentage fee is calculated at each phase as a percentage of the construction cost as defined in the agreement.

In the provincial or territorial fee guidelines, percentage fees usually include the fees of structural, mechanical, and electrical engineers — the three common engineering disciplines. And in some jurisdictions, "net percentage fees" are occasionally used, which exclude the provision of engineering services. This is sometimes the case in multiple-unit housing projects. This method can also be used when the architect is engaged under separate agreement, with the client engaging the engineers directly and the architect providing coordination services.

In the RAIC guideline there are two charts – one with percentage fees which include basic engineering (structural, mechanical and electrical engineering only) and one with percentage fees without basic engineering services. Other specialist consultants are not included in the percentage fee.

In all cases, ensure that sufficient fees are allocated for complete coordination. All tariffs or or fee schedules usually include coordination services in the net percentage provided.

However, the architect should verify this and compare the suggested percentage with the actual coordination requirements and the team composition. Architects can use the following rule of thumb: the cost to the architect for coordinating engineering consultants is approximately 25% to 35% of the engineering fee. Engineering services can also be negotiated as a percentage of the total construction cost to avoid disagreement over the amount to which the percentage is applied.

To ensure the validity of the amount, use the percentage fee method as a check when calculating a fixed fee (lump sum) quotation.

Refer also to the RAIC document, *A Guideline to Determining Appropriate Fees for the Services of an Architect*.

Time Basis (per diem and hourly rates)
A per diem or hourly rate is often the most appropriate method for establishing a fee, especially in the early stages of a project. Some other situations when this approach would be appropriate include:

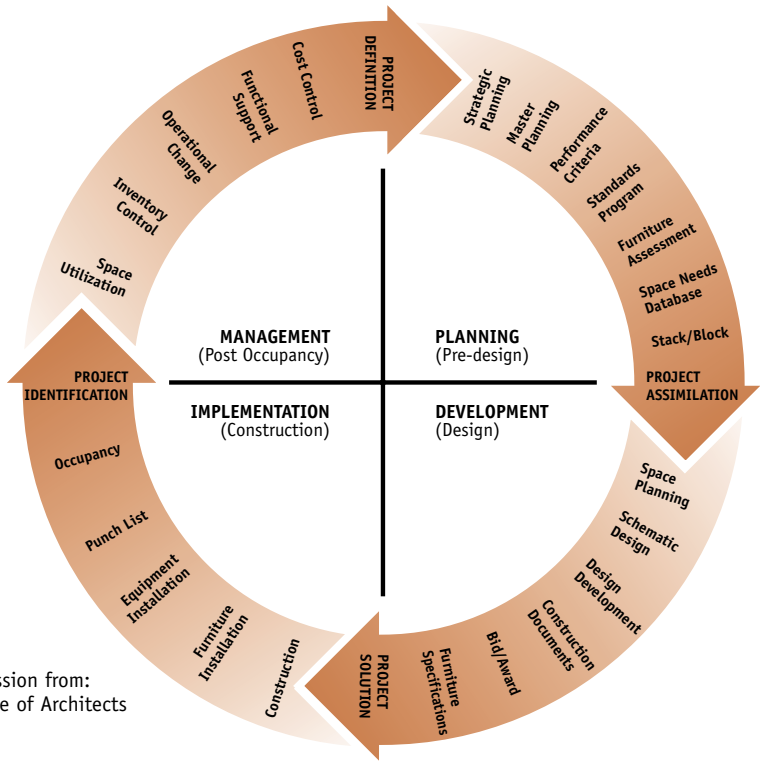
- pre-approved work being changed;
- small projects;
- pre-design or other types of feasibility studies;
- undefined scope of services;
- intermittent work or services.

Per diem or hourly rates are usually determined by the following:

- a multiplier of direct personnel expense [payroll cost (+) payroll burden (x) a multiplier];
- existing market conditions.

Traditionally, provincial associations have recommended higher per diem rates for special expertise such as acting as an expert witness or providing a unique or highly specialized service.

Illustration 4: The Client Support Circle



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Lump Sum or Fixed Fee
To use the fixed fee basis, both the client and the architect must thoroughly understand and agree on all tasks required and on the project schedule. The method also requires calculating all costs and making a comparison with the two other methods of compensation. Refer to Form 2.2, "Fee Calculation Sheet," provided in Chapter 2.2, *Sample Forms for the Management of the Practice*. When preparing a fixed fee quotation, include the following:

- all direct and indirect labour costs;
- all expenses, including materials;
- overhead and profit;
- risk factors involved with this client and this project;
- consultant costs;
- costs for coordination of consultants;
- marketing costs;
- a contingency.

Double-check the fee proposal and do a "reality check" based on market conditions by:

- determining fees as though they were based on a percentage of anticipated construction costs;
- re-calculating the costs to provide the fees very conservatively, using a worst-case scenario;
- checking the staff utilization rates and profit history of similar projects;
- ensuring that staff or partners double-check or independently verify the fee calculation.

With clear parameters, including a well-defined scope of services and construction estimate and project quality, the fixed fee can be a satisfactory approach for both the client and the architect. However, when unknown factors or an ill-defined project are involved, the fixed fee method can cause strained relationships and lead to substantial losses for the architect. Verify that all agreements include provision for determining the fee for:

- changes in scope;
- preparation of Change Orders;
- time delays (caused by the owner or contractor).

Trends in Architectural Services

Today, the architect often provides services in a different manner, including any combination of the following:

- partial services (where the requirement for basic services is more limited);
- expanded services (new services not previously offered, such as facility management and 3-D computer models and BIM);
- services through different project delivery methods (refer to Chapter 2.3.2, *Types of Construction Project Delivery*).

Different project delivery methods can mean an increase in both the scope of services and liabilities; therefore, the fee must be adjusted accordingly.

The scope of services varies for *each* project, *each* client, and *each* form of project delivery. As a result, it is now more common for architects and clients to identify services from a "menu" or "shopping list." This flexible approach is now recognized by the various different Schedules which must be appended to *Canadian Standard Form of Contract for Architectural Services – RAIC Document Six*. The American Institute of Architects (AIA) basic agreement, B141, recognize this reality. The AIA document, which views architectural services as a continuum in the life of a facility, groups the services as part of the following four stages:

- Planning or Pre-design;
- Development or Design;
- Implementation or Construction;
- Management or Post-occupancy.

(Refer to Illustration 4.)

This arrangement expands the possibility of architectural involvement beyond the "traditional" phases of a project. Some of these expanded, non-traditional services are outlined in "Checklist: Supplemental Architectural Services," at the end of this chapter.

Requests For Proposals

As requirements for professional services continue to change, so will the methods for engaging design professionals.

In seeking competitive submissions from architects, clients frequently use requests for proposals (RFPs) as a method of selecting architects. In responding to an RFP, the architect must carefully evaluate all conditions within the terms of reference to ensure that the architect will not be bound to provide services for which the architect is not competent or willing to provide.

Some RFPs outline a minimum "scope of services" but permit the proponent to offer additional services. Too frequently, RFPs are evaluated primarily or totally on the fee for professional services, without careful analysis and understanding of the full scope of services offered by the proponent. The architect must clarify and understand thoroughly the level of professional services required before providing a fee proposal.

RFPs can sometimes be ambiguous and provide incomplete descriptions of the project and the scope of services required; or, they describe the required services and terms and conditions as if the architect were a contractor or supplier of goods and not a service provider. Such RFPs should be questioned because client expectations for unrealistic scope of services, certain contractual obligations, and their subsequent consequences can be very detrimental to the project and to the practice. In some instances, the terms and conditions required from the RFP may not be insurable under professional liability insurance policies. Architects should encourage owners to change and improve such request for proposals or ask the architectural licensing authorities or the RAIC to intervene. If improvements are not made, architects should consider not responding to the RFP.

Refer also to the Checklist and Guidelines: Issuing Requests for Proposals (RFPs) at the end of Chapter 1.2.2., *The Client*.

Client-Architect Agreements

Regardless of the type of project, the architect should prepare and execute a written agreement with the client after identifying the full scope of services and negotiating a fee.

In British Columbia, written agreements are required by the Architectural Institute of British Columbia (AIBC).

It may be advisable to use an interim agreement or "binder" in order to start work while a full agreement is being prepared. The RAIC and some provincial associations have a single-page or short form agreement suitable for this purpose.

Architects should not use customized stand-alone agreements developed for the specific use of their own architectural practice. They stand to gain from promoting and adopting the Canadian standard forms of agreement between the client and the architect. These are produced by the architectural profession and accepted nationally. Furthermore, there is broad consensus on the meaning of the "General Conditions," and a certain amount of case law has been built up in their interpretation. These agreements are also consistent with CCDC contracts.

The guides contained with each of the standard contracts explain the use of the contracts and their terms as well as how to complete the forms. These contracts are:

- *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six;*
- *Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: RAIC Document Seven.*
- *Short Form Agreement Between Client and Architect — RAIC Document Eight.*

Definitions

***Construction Cost*:** Construction Cost is the contract price(s) of all Project elements designed or specified by, or on behalf of, or as a result of, the coordination by the Architect, including cash allowances, building permit fees, changes, construction management fees or other fees for the coordination and procurement of construction services, and all applicable taxes, including the full amount of value-added taxes, whether recoverable or not. Where there is no contract price for all or part of the Project, the Construction Cost shall be the estimate of probable cost of construction as determined by the Architect, or as agreed by the Architect if a Cost Consultant is engaged, at market rates at the anticipated time of construction. Construction Cost excludes the following:

- the compensation of the Architect and the Consultants,
- other professional fees which are the responsibility of the Client,
- the land cost, and land development charges.

In the event that the Client furnishes labour or material below market cost, or recycled materials are used, the Construction Cost for purposes of establishing the Architect's and Consultants' fees includes the cost of all materials and labour necessary to complete the Work as if all materials had been new and as if all labour had been paid for at market prices at the time of construction or, in the event that the construction does not proceed, at existing market prices at the anticipated time of construction.
***Fee*:** The amount of compensation paid to the architect for the provision of specific services. Reimbursable expenses or disbursements are not included.

Fixed Fee or ***Lump Sum*** or ***Stipulated Price*:** One stated sum of money for the performance or provision of specific services.

***Percentage Fee*:** A method of compensation which links the fee for architectural services to a percentage of the construction cost of the project. The percentage will vary depending on the type of building, the construction value, and the type of construction contract.

***Per Diem*:** Allowance or payment for each day.

***Service*:** Work performed, or the doing of work on behalf of an employer or client; benefit conferred, or exertion made, on behalf of someone; work comprised in whole or in part of labour, advice or supervision.

References

Royal Architectural Institute of Canada. *www.raic.org*

A Guide to Determining Appropriate Fees for the Services of an Architect.

Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six.

Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: RAIC Document Seven.

Short Form Agreement Between Client and Architect – RAIC Document Eight.

The American Institute of Architects (AIA). *The Architect's Handbook of Professional Practice.* 14th edition, Hoboken N.J.: John Wiley & Sons.

Provincial and Territorial Associations' Schedule of Fees or Tariff of Fees.

Architectural Institute of British Columbia. *Tariff of Fees for Architectural Services*. Revision #2 March 2004 *www.aibc.ca/member_resources/doc_index/tariff_of_fees/tariffoffees.PDF*

Alberta Association of Architects and the Association of Professional Engineers, Geologists and Geophysicists of Alberta. *Recommended Conditions of Engagement and Schedule of Professional Fees for Building Projects*.

Saskatchewan Association of Architects. *Bylaws of the Saskatchewan Association of Architects*, August 1997. Refer to Bylaw No. 16, 17, 18, 19, 20, 21, 22, 23, 24, and 25.

Manitoba Association of Architects. *Schedule of Suggested Professional Charges*. 1990.

Ontario Association of Architects. *A Client's Guide to Engaging an Architect in Ontario*, First edition, 2008

Association of Architects in Private Practice of Quebec/Association des architectes en pratique privée du Québec.

Architects' Tariff: The services, responsibilities and fees of the architect. January 2001.

Contrat entre maître d'ouvrage et architecte. Janaury 2001.

Agreement between Client and Architect. January 2001.

Architects' Association of New Brunswick. *Schedule of Recommended Fees.* March 1, 1993.

Architects Association of Prince Edward Island. *Conditions of Engagement and Suggested Schedule Minimum Professional Charges*. Latest edition.

Nova Scotia Association of Architects. *Conditions of Engagement and Schedule of Minimum Professional Charges*. Latest edition.

Newfoundland Association of Architects and Association of Professional Engineers and Geoscientists of Newfoundland. *Guidelines and Recommended Minimum Fees for Architectural and Engineering Projects*. March 2003

Stone, David A.

Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives Inc., 1999.

Appendix A - The Architect as Expert Witness

by Bernie McGarva and Cleo C. Kirkland

Introduction

There are two principal circumstances in which an architect will be called upon to testify as a witness at a trial or before a hearing. In the first, the case will involve a project for which the architect has provided services. In the second category, the case will involve a project from which the architect is entirely independent and previously uninvolved. This article will discuss the proper conduct of an architect as a witness in both circumstances.

The Architect as a Witness in a Case Involving a Project for Which He/She Previously Rendered Services

Frequently, an architect will be asked by a client to appear as a witness in a case arising out of a project in which the architect provided professional services. For example, the client may be involved in a dispute with a contractor or other consultant. Alternatively, the client may find itself embroiled in a claim brought by a third party, as in the case of a personal injury sustained on the premises of the project. **In all cases where an architect is contacted to act as witness in a case involving a project where he/she previously or is currently rendering services, the architect must contact his professional errors and omissions insurer to inform the insurer and to obtain guidance.**

All too frequently, these sorts of cases involving clients and others lead to future cases involving the architect. For instance, if an unfavourable outcome occurs in a given case, a client may look to the architect to compensate him for the costs or damages which have been sustained in the first case. This is why it is critical that an architect contact his insurer.

Sometimes an architect will be asked or summoned to testify by a party other than the client. The architect is under no legal obligation to speak to a party or a lawyer representing a party other than his client. However, if summoned, the architect will be under a legal obligation to appear in court or before the relevant tribunal.

Regardless of who has asked the architect to testify (be it the client or another party), in providing evidence in this sort of case, the architect should remember to testify in a manner which is complete and even-handed. The architect should not confuse his role with that of an advocate. While the architect has specialized skills and may testify about matters in which he/she is an expert, this does not mean that the architect's role is to promote the client's case.

It is important to understand that a summons (also known as a subpoena), is a legal document requiring the attendance of the person who is named to attend to testify in a court or before a tribunal. A summons, in almost all cases, requires the witness to bring relevant documents to court. A summons requires the attendance of the individual on a particular date and at a particular time. It may have been issued at the instance of any party to a proceeding (and as indicated above, not necessarily the architect's former or current client). In all cases where an architect has been summoned, or simply requested to testify by a party, **the architect must contact his insurer.**

It may seem unusual that an architect could be summoned or compelled to testify by someone with whom the architect has had no previous contractual relationship. However, this does occur from time to time. The fact that a stranger may have summoned the architect to testify does not end the architect's obligations and loyalties to his client. Those obligations however, can never override the architect's obligations to give evidence in a truthful, complete and even-handed manner.

An architect may be called not only to appear as a witness, but also to spend time preparing for the hearing, in consultation with the client, or with the client's solicitor. This should be considered to be extra work, and fees should be discussed and agreed upon before the work is undertaken.

An architect may be asked to prepare a detailed report for a client, or for the client's solicitors. Once again, this is generally considered to an additional service and the nature and extent of fees or remuneration should be discussed and agreed upon before the work is started.

Architects Called to Testify as Independent Experts

From time to time, an architect will be asked to testify as an expert witness in a case involving a project with which the architect has had no previous involvement. In such a case, it is expected that the architect is chosen to reflect the special expertise which he/she brings to bear on a particular issue or set of issues to be decided by the court or tribunal. In these situations, the architect's point of contact is frequently the lawyer of the party retaining the architect.

Since the architect was not previously involved in the project, he/she will have to rely upon the evidence which is put before him. The architect may find that he/she has been called upon to testify in these circumstances by an owner, by another architect, by another consultant, or by a third party. An independent architect expert is entitled to act for any of the above groups, and in all cases, is presumed to bring to the case expertise in an issue which is relevant to the court or tribunal and complete independence from any of the parties involved. Accordingly, it may be inappropriate for an architect to provide expert evidence for a close friend or relative. Such evidence would be tainted by the personal relationship involved and the architect's ability to provide independent evidence would be brought into question.

As in the case of architects who are called upon to testify in respect of their own projects, it remains the case that an independent expert architect must also testify in a balanced and even-handed way. Although called upon to support the case of a particular party, this does not thrust the architect into the role as advocate for that party. Experts who see themselves as advocates usually find their evidence met with suspicion and scepticism on the part of not only opposing parties, but the court or tribunal hearing the case. Keep in mind that the client and the client's lawyer want to know the problems and pitfalls of their case as well as the positives. The expert architect is uniquely positioned to assist in providing a balanced approach.

In some cases, an architect will be called upon to simply provide background advice to a lawyer on a construction matter. The architect may find himself giving the lawyer a summary course in a particular subject (for instance, "Roofing 101"). The architect may be asked to attend a trial or a hearing and observe evidence from certain witnesses and provide feedback to the lawyer for cross-examination. In this more limited role, the architect does not perform the full services of an expert witness. However, the architect's expertise and balanced approach is nonetheless called for.

Possible Appearances for the Architect as Witness

There are many different situations in which architects may find their witness services required. A partial listing of those situations is given below.

I. The Courts of Law

In most provinces, architects could appear in Small Claims Court, Provincial Court (Criminal Division) or a Superior Court of Justice.

II. Public Tribunals

Public hearings are conducted by boards and commissions constituted under municipal by-laws and provincial or federal statutes. Their purpose is to determine the rights of individuals under the particular by-law or statute under which the board or commission was established. Examples of such ongoing tribunals include the Ontario Municipal Board, the Environmental Assessment Board and the Atomic Energy Control Board.

III. Judicial Inquests

The terms of the provincial legislation regarding public enquiries (such as the *Public Enquiries Act* in Ontario) enable the provincial governments to establish commissions that will hold public hearings into particular matters arising from, or concerning, provincial statutes. The objective of these hearings is to establish the true facts of the situation; no finding of guilt is made.

IV. Royal Commissions

A Royal Commission is constituted for the purpose of conducting a public inquiry into a specific matter or circumstance. Ordinarily, participants will prepare a formal statement to the Royal Commission and submit it before the hearing. Appearances before such bodies are usually brief. Witnesses confine their remarks to one or two of the instances covered in the formal brief and their availability for questioning.

V. Coroner's Inquests

Coroner's inquests are not intended to determine guilt but to establish a fact or facts. Procedures are similar to those used in the courtroom, although a more informal approach usually exists. Architects are expected to exhibit conduct identical to that exhibited when appearing in court.

VI. Arbitrations

There are many types of arbitrations. Comments on courtroom procedure apply in principle, but must be modified to suit the particular circumstances and the dictates of the particular arbitration.

VII. Professional Disciplinary Hearings

Under the various provincial *Architects Acts*, a Discipline Committee or Conduct Committee, may conduct hearings into the manner and the quality of a member's practice and personal conduct. Procedures are similar to those in a courtroom, but architects are usually allowed somewhat greater latitude in conducting their defence than in a court of law. In the context of a disciplinary hearing, architects acting as expert witnesses can act for either the prosecution or the defence, in a given hearing.

Accepting an Assignment

The following quote from RIBA's Practice Management Handbook is helpful:

> *"Architects are sometimes approached to act as expert witnesses. This is highly specialized work, not to be undertaken lightly. Years can elapse before a case goes to court and, once underway, the expert witness is expected to put aside all normal work commitments and engagements and put him or herself at the court's disposal – often for a lengthy period. This will inevitably have disruptive effect on both personal and practice commitments.*
>
> *Expert witnessing is exacting work: lawyers expect expert witnesses to stand up to hostile cross-examination and then to be able to think on their feet. To have credibility in the eyes of the court, the reports of an expert witness must be patently impartial and objective, whichever side has commissioned them."*

Before agreeing to accept an assignment that may involve legal procedures, architects should first be fully satisfied with several important issues.

I. Competence

Competence is a "quality of having suitable skill, knowledge or experience for some purpose". It is a dynamic quality that relates to the present task, assignment or activity. Architects should assess their competence by determining that their theoretical knowledge, practical experience and reputation in their field are of a suitable extent and depth to enable them to put forward and to defend a position that would be useful for the client and credible to the court. Judges place considerable weight on the experience of expert witnesses. This is not to say that age will in all cases triumph over youth. However,

a Judge will carefully consider past relevant experience in similar projects in assessing the credibility and weight to be given to the expert's evidence.

II. Conflict of Interest

Architects should examine their personal involvement in the affairs of any of the parties to the action or the inquiry, to ensure that they have no conflict of interest. The architect should also examine any relationships with other clients who are not directly involved, and make certain that participation in the action or inquiry will not result in a disadvantage to them. Architects in large firms will find that conflicts may abound. The party seeking to retain the architect may be acting adversely to an existing or former client of the firm. Similarly, in smaller communities, personal conflicts will also be frequent. All too often the party whom you are asked to testify against will turn out to be a neighbour or friend. If there appears to be any conflict of interest, the architect should immediately consult a lawyer or his professional association for guidance.

III. Conditions

Architects should ensure that their normal business activities are not put at risk because of unexpected or unreasonable time demands, or inadequate notices of appearances. Architects should also ensure that informal or personal short-term commitments will not lock them into unwanted longer term involvement. Finally, architects should ensure that clients understand the possibility that some situations may demand particular skill or knowledge beyond that which they possess and that clients ought to retain specialist services they judge to be necessary.

IV. Restrictions

A client may impose restrictions relating to monetary matters, to confidentiality, to access to essential information and to certain directions which an investigation might take. The investigation may suggest that the architect's testimony may take a direction not in keeping with the wishes of the client. In such circumstances, the architect has an immediate obligation to advise the client and counsel of the situation. In rare cases, a client or his counsel may seek to impose restrictions on access to information which makes a fair and dispassionate opinion impossible. In these cases it is incumbent upon the architect to either obtain relief from the restrictions, or decline the retainer. Impressions formed about your credibility and capacity as an expert witness in one case can have lasting consequences. Risking your credibility for the future by taking on a retainer with which you are uncomfortable is a bad gamble.

V. Confidentiality

In day-to-day practice, the architect has an ethical and often contractual obligation to keep secret and confidential any conclusions reached during any investigation undertaken on behalf of a client. However, the court has the authority to overrule or alter the original obligation. There is a rule of evidence termed "privilege", which permits a witness to refuse to answer a particular question, or to produce a particular document. Relationships between architects and their clients do not qualify for such "privilege". As a result, the architect who is asked to keep the source or the nature of secret information or trade secrets fully confidential and protected, cannot extend such assurances in most court cases. It will be up to the court or tribunal involved to decide whether architects should be forced to violate a promise of confidentiality. Always label reports as "privileged for the advice of counsel". This assumes of course that the reports have been requested by client's counsel. Also be sure to include a clause that specifies that the report was produced for that particular litigation.

VI. Agreement and Fees

To protect yourself and your client, a written contract setting out the nature of your services should be prepared. The contract may take the form of a detailed letter outlining the architect's understanding of the commission.

Any agreement should make it clear to the client that the architect must remain impartial and is to be reimbursed for professional services, no matter what the outcome. Architects should adequately address issues relating to fees and disbursements. The agreement should set out the services to be provided, the rates of payment applicable, the times and terms of payment, and the desired guarantee of fees. Progress payments and escalation provisions should be included for extended periods of investigation or activity. Changes and additions to the original terms of the contract may be initiated by the client, legal counsel, or by the architect. It is important that careful documentation and accounting be made for all "extras".

Conducting Investigations and Field Work

Before architects can give any evidence at all, they must have made an investigation which involves an examination of the matter in dispute in the field and any analysis that might be required in order to reach their conclusions.

I. Degree of Thoroughness

The architect must be fully aware of the client's needs, address only these in the report and avoid unnecessary investigation. A personal inspection of the site where the incident occurred is considered to be essential. Professional quality photographs, preferably in colour, will assist with later descriptions of the site or of site materials and should be accompanied by documentation and witnessing to make sure they are admissible in court. The architect should review and become familiar with all pertinent documentation, manuals, standards, specifications, contracts, hardware or other materials and design drawings. A search of available technical literature, and identification of related commentary, can be useful.

II. Documentation

It is important that all pertinent information, especially information that may be unavailable at a later time, be properly identified and recorded. The architect should record where; when and from whom information was obtained; what the information is; where it came from and when; names and descriptions of things; and time, place, and location of site investigation(s).

Defining the Problem

Clients may ask for something without knowing precisely what they want, or the implications of the request. The architect must know what the client's strategy is, and what the course of action is expected to be in order to judge the usefulness of the request. Architects must restrict both interest and activity to architecture. They should avoid attempting to solve the case by departing from their field of expertise, keeping their opinion to architectural matters and avoiding speculation, or subjective opinion.

Analysis

It is important that the architect acting as expert witness did the work him or herself, in order that he or she be able to answer questions that will arise from consideration of the analysis.

Often, the underlying workup report will have been prepared or performed by an associate or partner working with the expert who is testifying. The involvement of a colleague should be disclosed in the report. It is important not to mislead anyone as to the precise nature of the retainer and background involvement.

Formulating Conclusions

The architect must assess the information gathered during investigations to determine if it is sufficient to form a conclusion. If it is, the conclusion may be written; it should be carefully worded, so that it may be read in a positive sense. The use of disclaimers can dilute, if not negate the effect of the report, but the wording should accurately reflect the degree of certainty of the architect's opinion.

The architect should not hesitate to express an opinion in the conclusion, but it is very important to show how the opinion was formed from the data presented.

If it is not possible to state an opinion (for instance, in the event of insufficient information), the architect should clearly state that no final opinion was reached and the reasons why.

Preservation of Evidence

It is important that data and material which may become official evidence in a hearing or court procedure be held safely under the architect's control until required to be produced. Evidence should be identified by marking and/or tagging it with information about where, when and under which circumstances it was taken. It should be retained until appropriate clearance or permission for destruction is given.

Calculations not in the report, test results and file data should be kept confidential, but in such a "presentable" form that they can be used at an appropriate time and on the understanding that they may become a part of court documentation.

Reports

Architects tend to use drawings as their principal means of communication; however, in work done for legal purposes, it is customary to use a written report as the primary means of conveying the sense of the work. The language and writing style should be simple and direct, and the use of abbreviations and technical terms should be avoided where possible.

I. The Preliminary Report

The preliminary report serves only one purpose: it is a means of apprising the client about the progress of the investigation. Conclusions of any kind should be avoided.

II. The Final Report

Before preparing the final report, it will be desirable to discuss the findings and conclusions with the client and his or her counsel to obtain guidance about the precise issues the client wishes to have included. Nevertheless, the architect must accept final responsibility for the report and must not permit the client to exert influence on its final form or substance.

The final report must deal with the agreed-upon terms of reference, i.e., the client's needs. The introduction should explain who hired the architect, what the terms of reference were, and what was done to fulfill the commission. It should be complete and impartial. Observation about possible weaknesses in the client's position should be communicated to the client and his or her counsel separately, as this increases the likelihood that neither the client nor his or her counsel are misled by an overly favourable report, or by failure to give proper emphasis to adverse considerations.

While the body of the report must be simple and couched in non-technical language, appendices are permissible and may cover specialty subjects intended to be read by knowledgeable individuals.

The Giving of Evidence

Architect witnesses bring "expert" knowledge to proceedings primarily involving people who do not share that knowledge. **Architects are strongly advised to consult with counsel before engaging in such proceedings and to receive advice and instruction about all of their actions.**

I. Preparation for the Appearance

Professional witnesses should know their subject thoroughly. They should review all file documents to the point where they are fully familiar with the contents and believe they can answer questions relating to them. Architects should be aware that opposing counsel will attempt to confuse witnesses by asking questions sufficiently different from those anticipated. This can be counteracted through conducting the preparation with assistance from legal counsel.

When appearing on behalf of a client who is represented by a lawyer, it is essential that the architect request a preliminary meeting with the lawyer. This allows the architect to review the evidence that will be presented and ensure that counsel for the client understands what will be said on the stand and what that evidence means.

In less formal proceedings, architects should remember to confine their answers to those matters with which they are thoroughly familiar and avoid non-architecture related opinions.

Architect witnesses have an obligation to choose their words carefully so that those at the hearing understand the technical information being conveyed. It may be useful to rehearse the presentation. It is important that architect witnesses remember that the testimony being given is not directed to the examiner, cross-examiner, or client, but to the "court" with the objective of enabling the court to make the best judgment possible. The witness should not speak as an advocate, or as a debater, but should present facts, expert observations and conclusions.

II. What to Expect in the Courtroom

When waiting to be called as a witness, it is important to be careful in conversations with strangers or those whose particular interests in the proceedings are unknown. While politeness is expected, and safe topics may be treated in a light vein, discussion of evidence must be avoided.

III. Procedures and Rules

Witnesses are usually called in a previously agreed upon order. They will be subject to direct examination, cross-examination, re-direct examination and, very occasionally, re-cross-examination, in that order.

Witnesses should take instructions from the officials of the court, such as the judge and the lawyers involved; they should follow their lead, and observe with care the customary courtesies. It is not desirable to be moving about when not actively involved. A discreet silence should be maintained. Notes may be taken during the proceedings.

Once called and sworn, witnesses under examination are not customarily allowed to discuss the case with anyone, until asked to stand down. However, on occasion, they may properly discuss with their counsel matters which have not been covered in the examination up to that time, but it is inadvisable for witnesses to initiate such discussions. Between completion of examinations-in-chief, commencement of cross-examination, and commencement of re-examination, no discussions relative to any aspect of the proceedings are permitted.

Witnesses before tribunals will usually find that many of the usual courtroom procedures will apply. However the conduct of the hearing will follow the rules laid down by the chair; these must be observed without question

Qualification as an Expert by the Court

In giving oral evidence as to qualifications, the witness should concentrate on only those qualifications which relate to the case at hand. Prepared listings of qualifications or curricula vitae are almost always useful and may, with the agreement of counsel, be introduced into the proceedings as an exhibit. If such documents are used, they should be concise and should be shown to counsel well in advance of the hearing.

Conduct Under Examination

I. Examination-in-Chief

The witness will be first examined by the client's lawyer who will ask a series of questions similar to those discussed in private. It is important that the answers given are consistent with previous replies and limited only to exactly what was asked. Witnesses must be careful to avoid being "set-up" for trouble during cross-examination by saying things that may be inconsistent with their general testimony.

If a witness recalls additional relevant information after they have answered, witnesses can retrace previously covered steps, provided the lawyer and court agrees. After providing an initial answer, a witness may request the opportunity to offer the further explanation. The lawyer and the court will direct the witness on how to proceed.

While on the stand, the use of notes should occur only if such a procedure has been agreed to beforehand by the parties involved, including legal counsel, since there is the possibility that the notes could be forced into evidence as exhibits. When testifying as "experts", it is essential that witnesses give only their own opinions; reliance on other experts or text books is self-defeating.

II. Cross-Examination

This stage will be conducted by lawyers representing other parties. Their objective may be to discredit witnesses by questioning their competence, or by trying to find inconsistencies in their testimony in order to cast doubt on the whole testimony. It is most important to preserve credibility. This may be accomplished by maintaining a consistency in answers, by reasonable and logical explanations where possible, by asking for clarification when necessary, and by acknowledging that one does not know, if that is the case.

Lawyers use many techniques to put witnesses off guard. They may suggest variations of what was originally said by witnesses, and ask them to agree to increasingly narrow generalizations, until witnesses are unable to prevent themselves from being shown to be inconsistent.

Architect witnesses should listen closely to the exact question put by the cross-examiner and, unless fully satisfied that the proposition correctly expresses their views, use their own language instead. If asked why they are reluctant to agree to the cross-examiner's proposition, witnesses can reply that they can never quite be sure what the cross-examiner means, but can at least be sure of what they themselves have in mind when using their own words to express opinions.

Witnesses should be careful attempting to justify their testimony. If the cross-examiner attacks in an accusatory fashion, implying that something is wrong, the witness should listen carefully to the questions, and answer as directly as possible, consistent with previous testimony. If the cross-examiner demands a "yes or no" answer, the witness should assess whether the question cannot be answered in that way without misleading the court. If it is not possible, simply advise the court.

Architect witnesses should scrupulously maintain an attitude of professionalism, accompanied with sincerity and honesty. It is important that witnesses avoid losing their temper, or displaying any rudeness toward cross-examining counsel, otherwise they may appear to be less sympathetic and less credible.

III. Re-Direct Examination

Re-direct examination may follow cross-examination. Counsel for the witness' client may ask additional questions on points not previously raised by the witness, and on which clarification is needed. The additional questioning may also be necessary to correct impressions the client's lawyer suspects may have been made during cross-examination. While under re-direct examination, follow the usual guidelines and testimony as outlined above.

Conclusion

The preceding guideline has been prepared to provide architects who become involved in court proceedings or tribunals with suggestions on how to proceed as a witness. It is hoped that these suggestions will lead to making the architect's performance as a witness more effective. In any case, it should also serve as a caution to architects who are considering becoming witnesses or who are already involved in proceedings of the pitfalls and concerns which may arise:

In conclusion, the following basic guidelines are worthy of review:

- 1. When called upon to act as a witness in respect of a project on which you have previously provided architectural services, always contact your professional errors and omissions insurer for advice.
- 2. If you are called upon to act as an independent expert, be sure that you have adequate expertise and experience with respect to the issues on which you are being asked to testify.
- 3. Always remember that whether you are an independent expert, or are testifying on behalf of an existing client, you are a witness, and not an advocate. Leave the advocacy to others. Concentrate on giving accurate and complete evidence.
- 4. In all situations where you will be testifying in court, prepare thoroughly, familiarize yourself comprehensively with the information base on which you may be questioned, and in circumstances where you are an independent expert, request an opportunity to review your evidence with counsel in advance.
- 5. During testimony, avoid arguments and personalities. Maintain your composure. Answer the questions which you are asked directly and do not attempt to anticipate the next question.
- 6. Whether you are retained as an independent expert, or in your capacity as the current or past architect for an existing client, satisfy yourself with respect to the contractual arrangement in place with respect to your testimony. Litigation proceedings are notoriously lengthy and your involvement may take much longer and be at a greater personal cost in terms of time and other resources than you have anticipated.

Definitions

***Admissible*:** Relevant evidence not otherwise excluded.

Arbitration: A hearing to determine an interest dispute, heard by an arbitrator.

***Board*:** A body of persons to which certain powers are delegated or assigned or who are elected for certain purposes.

***By-law*:** A law binding on all persons to whom it applies.

***Commission*:** The name of a body which has the authority to administer a program or statute, manage a fund or a public utility, investigate a matter or perform some other public function.

***Conflict of Interest*:** Interests that conflict, and that might influence or interfere with the ability to perform his or her function or exercise of duty. This can occur when the person is in a position of trust which requires him or her to exercise judgment on behalf of others (people, institutions, etc.) and also has interests or obligations of the sort that might interfere with the exercise of his or her judgment, and which the person is morally required to either avoid or openly acknowledge.

***Counsel*:** A barrister or solicitor, in respect of the matters or things that barristers and solicitors respectively, are authorized by the law of a province to do or perform in relation to legal proceedings.

***Discovery*:** Disclosure by the parties before trial of information and documents.

***Escalation Clause*:** Clause in agreement providing for increases in rent, wages, or other form of payment, based on some factor such as tax increases.

***Evidence*:** The oral and written statements and information and any actual things produced in a proceeding, anything which may be used to prove a fact or support an assertion.

***Examination*:** The questioning of a person under oath.

***Exhibit*:** A document or object admitted as evidence in court.

***Expert Witness*:** A witness whose competency to form an opinion on some subject before the court was acquired by a special course of study or experience.

***Hearing*:** Generic label to describe trials, appeals, and interlocutory proceedings (proceedings which are provisional, temporary or determined by the court prior to final judgement).

***Inquest*:** An inquisitorial investigation, where no parties' rights are directly affected.

***Inquiry*:** An investigation, a hearing.

***Litigation*:** A law suit and all the related proceedings; the term may refer to any proceeding before a court of tribunal.

***Notice of Appearance*:** A party's written notice filed with the court or oral announcement on the record informing the court and the other parties that the party wants to participate in the case.

***Objection*:** A formal statement opposing something that has occurred, or is about to occur, in court and seeking the judge's immediate ruling on the point.

***Privilege*:** Acts as an exception to the truth finding process of trials. All relevant evidence is presumed admissible but some probative and trustworthy evidence is excluded in order to serve overriding social interests. Similarly, some communications arising out of defined relationships are exempt from disclosure in judicial proceedings.

***Proceeding*:** The regular and orderly progression of a lawsuit, including all acts and events between the time of commencement and the entry of judgement.

***Provincial Court*:** Court constituted under s. 92(14) of the *Constitution Act* and constituted, maintained and organized by the provincial legislature to administer justice in the province.

***Remuneration*:** Payment for services provided.

***Retainer*:** A preliminary fee given to secure services and induce them to act for the client.

***Small Claims Court*:** An inferior court with a limited jurisdiction over civil matters limited as to monetary jurisdiction and as to subject matter.

***Solicitor*:** Refers to one who does not appear in court regularly but does any of the other work of being a lawyer.

***Statute*:** A law or act which expresses the will of a legislature or Parliament.

***Subpoena*:** Document issued by a third party compelling a person to attend proceedings as a witness in order to give testimony, given under the threat of penalty.

***Summons*:** A document issued by a court, an agency, board or commission, or another person authorized to issue summonses, requiring a person to attend as a witness at a trial, hearing or examination, to produce documents or other things or to testify before the issuing body or person.

***Testify*:** Giving evidence by means of oral communication in a proceeding.

***Testimony*:** The evidence which a witness gives in a court or tribunal.

***Tribunal*:** A body or person which exercises a judicial or quasi-judicial function outside of the regular court system.

***Witness*:** A person who gives evidence orally under oath or by affidavit in a judicial proceeding.

All definitions are taken from, or based on, The Dictionary of Canadian Law, 3rd ed. (Toronto: Thomson-Carswell, 2004) and Black's Law Dictionary, 8th ed.

References

Canadian Sources

Marie Corbett, "The Ontario Municipal Board: Planning and Zoning Cases" (1976) 14 Osgoode Hall L. J., No. 1.

Lawrence E. Glazer, "Architects Can Provide Expert Advice in Construction Cases" (1998) 18 Lawyers Weekly, No. 11, 9(2).

Andrew J. Roman, Guidebook on How to Prepare Cases for Administrative Tribunals, 1st ed. (Ottawa: Consumers' Association of Canada, 1997).

S.S. Aidlin, *The Expert Witness Prepares for Court*.

International Sources

"Architect and Engineer Liability" (1995) 35 Washburn L.J. 32.

"Authorizing the Expert Witness to Assassinate Character for Profit: A Re-examination of the Testimonial Immunity of the Expert Witness" (1997) 28 U. Mem. L. Rev. 239.

John A. Bickley, "The Engineer and Litigation" (1991) 8 Int'l Constr. L. Rev. 398.

John P. Black & Richard A. Long, "The Engineer as an Expert Witness: Perspective and Performance" 11 Envtl. Claims J. 83.

"Daubert v. Merrell Dow Pharmaceuticals, Inc: 'Gatekeeping' or Industry 'SafeKeeping'?" (1998) 43 S.D. L. Rev. 566.

"Eight Gates for Expert Witnesses" (1999) 36 Hous. L. Rev. 743.

"Expert Information and Expert Evidence: A Preliminary Taxonomy" at the Expert Admissibility Symposium: What is the Question? What is the Answer? How Should the Court Frame a Question to Which Standards of Reliability Are to be Applied? (2003) 34 Seton Hall L. Rev. 141.

"Fragmenting Knowledge, Misconstruing Rule 702: How Lower Courts Have Resolved the Problem of Technical and Other Specialized Knowledge in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*" (1999) 1 J. Intell. Prop. 1.

John K. Gisleson, "Testimony of Engineers and Other Non-Scientific Experts – Evidentiary Reliability Consideration" 70 Pa. B.A.Q. 74.

Paul Hyett, "Architect as Expert" (1994) 138 Solicitors Journal No. 48, s. 30(1).

Tomas Kennedy-Grant, "Expert Evidence in Construction and Engineering Cases" (2003) 20 pt. 3 Int'l Constr. L. Rev. 401.

Paul G. Kerr, "The Costs of Consulting Engineers in Civil Litigation: The Basis of Charge" (1991) 41 N. Ir. Legal Q. 123.

Wayne C. Lusvardi, "The Real World of Forensic Engineering" (2001) 13 Envtl. Claims J. 103.

Thomas Lyons, Esq., "Frye, Daubert and Where Do We Go From Here?" (1997) 45 RI Bar Jnl. 5.

Richard R. Macguire, "Experts in Low Speed Impact Litigation" (2005) 77 NY state Bar Assn 43.

"Marnette v. Morgan: When Other Evidence Contradicts the Expert Testimony – Admissibility or Credibility?" (1993) 38 S.D.L. Rev. 763.

Phillip H. Miller, "Cross-examining a Biomechanical Engineer" (2001) 37 Trial 38.

"Much Ado About Nothing – The Supreme Court Still Fails to Solve the General Acceptance Problem Regarding Expert Testimony and Scientific Evidence" (1993) 8 J.L. & Health 245.

David Nolte, "Semi-annual Guide to Expert Witnesses: Improving Cross-Examination of Expert Witnesses" (2005) 28 Los. Angeles Lawyer 41.

David Nolte, "Semi-annual Guide to Expert Witnesses: Ten Rules" (2004) 27 Los Angeles Lawyer 50.

"Novel Expert Evidence in Federal Civil Rights Litigation" (1995) 45 Am. U.L. Rev. 2.

"Protecting Juries From Themselves: Restricting the Admission of Expert Testimony in Toxic Tort Cases" (1994) 48 SMU L. Rev. 103.

"Quantifying Liability Under the Architect's Standard of Care" (1995) 29 U. Rich. L. Rev. 1471.

Barry A. Ross, "Eminent Domain and the Community Association" (2003) 45 Orange County Lawyer 28.

L.D. Ryan, "The Fiction of Technical Peer Review" (2003) 39 Trial 68.

"Scientific Evidence in the Age of Daubert: A Proposal For a Dual Standard of Admissibility in Civil and Criminal Cases" (1994) 21 Pepp. L. Rev. 1391.

"Screening Expert Testimony After Kumho Tire Co. v. Carmichael" (2000) 8 J.L. & Pol'y 543.

"Sharpening the Focus on Daubert's Distinction Between Scientific and Non-scientific Expert Testimony" (1997) 34 San Diego L. R. 1719.

"The Admissibility of Lay and Expert Opinions" (1989) 57 Tenn L. Rev. 103.

"The Crumbling Tower of Architectural Immunity: Evolution and Expansion of the Liability to Third Parties" (1984) 45 Ohio St. L.J. 217.

"The Effects of Daubert on the Admissibility of Expert Testimony in State and Federal Criminal Cases" (2002) 8 Psych. Pub. Pol. and L. 339.

"The Same Mold Story?: What Toxic Mold Is Teaching Us About Causation in Toxic Tort Litigation" (2005) 83 N.C.L. Rev. 518.

"Tort Law – Municipal Building Inspector's Actions Fall Within Special Duty Exception to the Public Duty Doctrine – Quality Court Condominium Ass'n v. Quality Hill Development Corp., 641 A. 2d. 746 (R.I. 1994)" (1995) 29 Suffolk U. L. Rev. 655.

"What Is an Environmental Expert? The Impact of Daubert, Joiner and Kumho Tire on the Admissibility of Scientific Expert Evidence" (2001) 19 UCLA J. Envtl. L & Pol'y 401.

"Witness Immunity or Malpractice Liability for Professionals Hired as Experts?" (1998) 17 Rev. Litig. 393.

Checklist: Scope of Services

This chart is a typical checklist of services offered by the architect and his or her sub-consultants. The nature of the individual project and the services customized to the client's needs will determine the scope of services required.

Project Inception	Project Assessment	Concept Approval	Approvals from Authorities	Awards of Construction Contract	Substantial Performance of Construction/Occupancy Permit

1.0 Pre-design	2.0 Schematic Design	3.0 Design Development	4.0 Construction Documents	5.0 Bidding or Negotiation	6.0 Construction — Contract Administration	7.0 Post-construction
Architect's Services • Facility Programming • Space Relationships/ Flow Diagrams • Project Development Scheduling • Project Budgeting • Life Cycle Cost Studies • Economic Feasibility Studies • Agency Consulting/ Review/Approval • Site Selection/ Analysis Utilization • Environmental Studies • Energy Studies • Existing Facilities Surveys • Client-Supplied Data Coordination • Services Related to Project Management • Presentations • Marketing Studies • Project Financing • Special Studies • Re-Zoning Assistance • Project Promotion **Special Consultants' Services** • Legal Survey • Geotechnical Analysis	**Architect's Services** • Client-supplied Data Coordination • Program and Budget Evaluation • Review of Alternative Design Approaches • Architectural Schematic Design • Schematic Design Drawings and Documents • Statement of Probable Construction Costs • Client Consultation • Interior Design Concepts • Special Studies (Future Facilities, Environmental Impact, etc.) • Special Submissions or Promotional Presentations • Special Models, Perspectives or Computer Presentations • Project Management • Agency Consultation **Consultants' Services** • Structural Design Concepts • Mechanical Design Concepts • Electrical Design Concepts • Statements of Probable Costs **Special Consultants' Services** • Civil Design Concepts • Landscape Concepts • Statements of Probable Costs	**Architect's Services** • Client-supplied Data Coordination • Design Coordination • Architectural Design Development • Design Development Drawings and Documents • Statement of Probable Construction Costs • Client Consultation • Interior Design Development • Special Studies/Reports (Planning Tenant or Rental Spaces, etc.) • Promotional Presentations • Models, Perspectives or Computer Presentations • Project Management • Agency Consultation **Consultants' Services** • Structural Design Development • Mechanical Design Development • Electrical Design Development • Statements of Probable Costs **Special Consultants' Services** • Civil Engineering Design Development • Landscape Development • Detailed Construction Cost Estimates or Quantity Surveys	**Architect's Services** • Client-supplied Data Coordination • Project Coordination • Architectural Construction Documents (Working Drawings, Form of Construction Contract and Specifications) • Document Checking and Coordination • Statement of Probable Construction Costs • Client Consultation • Interior Construction Documents • Alternative Bid Details and Special Bid Documents • Project Management • Agency Consultation **Consultants' Services** • Structural Construction Documents • Mechanical Construction Documents • Electrical Construction Documents • Statements of Probable Costs **Special Consultants' Services** • Civil Engineering Construction Documents • Landscape Documents • Detailed Construction Cost Estimates or Quantity Surveys	**Architect's Services** • Client-supplied Data Coordination • Project Coordination • Issue Bidding Documents • Issue Addenda • Bid Evaluation • Construction Contract • Client Consultation • Separate Bids or Negotiated Bids • Services Related to Bidders' Proposals • Project Management **Consultants' Services** • Issue Bidding Documents • Issue Addenda • Bid Evaluation **Special Consultants' Services** • Issue Bidding Documents • Issue Addenda • Bid Evaluation	**Architect's Services** • Construction Review • Progress Reports/Evaluation • Process Certificates for Payment • Interpretation of Contract Documents • Review of Shop Drawing Product Data/Sample • Change Orders • Substantial Performance Report and Certification • Client Consultation • Interior Construction Inspection • Full-time Project Representation • Administration of Separate Contracts • Project Management • Promotional Material • Record Drawings • Agency Consultation **Consultants' Services** • Structural Inspection/Reports • Mechanical Inspection/ Reports • Electrical Inspection/Reports • Record Drawings • Certification of Progress **Special Consultants' Services** • Civil Construction Inspection • Landscape Inspection • Detailed Cost Accounting	**Architect's Services** • Field Review • Deficiency Assessment • Instructions for Correction of Deficiencies • Review of Warranties • Total Performance Inspection and Certification • Client Consultation • Start-up Assistance • One-year Warranty Inspections **Other Services** • Fine Arts/Crafts/Graphics • Non-building Equipment Selection • Building Analysis and Reports • Services Related to Alterations and Demolition • Life Cycle Cost Monitoring • Environmental Monitoring • One-year Warranty Inspections **Consultants' Services** • Start-up Assistance • Systems Performance Review • Non-building Equipment Selection • Life Cycle Cost Monitoring • Services related to Alterations and Demolition

Checklist: Supplemental Architectural Services

The following is a list of some of the specialized services offered by architectural practices or coordinated with special consultants.

Pre-design Services

- ❑ Facilities Programming
- ❑ Feasibility Studies
- ❑ Existing Site and Facilities Analysis
- ❑ Traffic and Parking Studies
- ❑ Existing Equipment and Furniture Inventories
- ❑ Energy Analysis
- ❑ Master Programming and Planning
- ❑ Environmental Studies
- ❑ Space Schematics/Flow Diagrams
- ❑ Marketing Studies
- ❑ Financial Analysis
- ❑ Project Financing
- ❑ Advisor for Architectural Competitions
- ❑ Preparation of Proposal Call Documents

Post-construction Services

- ❑ Commissioning Services
- ❑ Post-occupancy Studies
- ❑ Maintenance and Operational Programming
- ❑ Building Maintenance Manuals
- ❑ Post-occupancy Evaluation

Site Development Services

- ❑ Site Analysis and Selection
- ❑ Site Development Planning/ Site Plan Agreement
- ❑ Detailed Site Utilization Studies
- ❑ On-site Utility Studies
- ❑ Off-site Utility Studies
- ❑ Environmental Studies and Reports
- ❑ Zoning and Land Use Amendments
- ❑ Geotechnical Engineering
- ❑ Site Surveying
- ❑ Legal Survey
- ❑ Landscape Design

Materials and Systems Testing

- ❑ Procurement of Testing Services
- ❑ Review and Analysis of Testing

Interior Design and Design Services

- ❑ Space Planning
- ❑ Adaption of Mechanical and Electrical Systems and other Systems to Tenant Needs
- ❑ Preparation of Furnishing Requirements
- ❑ Bidding or Purchasing Procedures for Furniture
- ❑ Furniture and Equipment Selection and Layout
- ❑ Special Furnishings Design
- ❑ Tenant-related Services
- ❑ Interior Partition Location
- ❑ Furniture and Finishing Specifications
- ❑ Selection of Interior Materials, Finishes, and Colours
- ❑ Procurement of Furniture
- ❑ Coordination of Installation and Delivery of Furniture
- ❑ Design of Interior and Exterior Signage and Symbols
- ❑ Selection or Acquisition of Fine Arts or Crafts
- ❑ Graphic Design
- ❑ Documentation of Requirements and Procurement of Graphics Work

Project Administration and Construction Management Services

- ❑ Project Administration
- ❑ Disciplines Coordination/Document Checking
- ❑ Consulting with and Review and Approval of Authorities
- ❑ Submittal Services
- ❑ Owner-supplied Data Coordination
- ❑ Schedule Development/Monitoring
- ❑ Testing and Inspection Administration
- ❑ Project Representation
- ❑ Supplemental Documentation
- ❑ Administration of Multiple Contracts
- ❑ Detailed Cost Estimates and Quantity Surveys
- ❑ Value Analysis or Value Engineering
- ❑ Life Cycle Cost Analysis
- ❑ Coordination of Mock-ups
- ❑ Facility Management
- ❑

Promotion and Public Relations

- ❑ Preparation of Press Releases
- ❑ Preparation of Promotional Brochures
- ❑ Presentations at Public Meetings
- ❑ Preparation of Leasing Material
- ❑ Preparation of Models
- ❑ Preparation of Renderings
- ❑ Condominium Documentation
- ❑ Computer Presentations

Documentation Services

- ❑ Preparation of Special Certificates and Letters of Assurance
- ❑ Certified Area Calculations
- ❑ As-Built Drawings and Computer Files
- ❑ Preparation of Measured Drawings
- ❑ Building Inspection and Reporting
- ❑ Aerial Site Photography
- ❑ Still Photography of Existing Conditions
- ❑ Periscope Photography of Models
- ❑ Presentation Photography of Renderings or Models
- ❑ Construction Progress Photographs
- ❑ Architectural Photography of Completed Building or Site
- ❑ Videotaping
- ❑ Computer Database
- ❑ Inventories of Materials, Equipment or Furnishings

Architectural Conservation

- ❑ Historic Building Documentation
- ❑ Heritage Conservation District Studies
- ❑ Conservation Reports

Expert Witness

- ❑ Testimony at Court or Hearing
- ❑ Opinion on Codes or Regulations

Computer Applications

- ❑ Computer Renderings
- ❑ 3-D Computer Presentations and Walk-throughs
- ❑ Electronic Communication and Distribution
- ❑ Computer Analysis and Mock-ups
- ❑ Project Scheduling
- ❑ Project Accounting

Urban Design

- ❑ Streetscape Design
- ❑ Drafting of Zoning Bylaws and Regulations
- ❑ Shadow Studies
- ❑ Urban Design Studies
- ❑ Wind Studies
- ❑ Land Use Studies
- ❑ Transportation Studies

Research

- ❑ Research in Construction Materials and Methods
- ❑ Building Envelope Investigation

2.2 Standard Forms for the Management of the Practice

Guide to the Use of the Forms
- Purpose of the Forms
- Office Manual
- Other Forms

1. Forms for Human Resources Management
- 1.1 Typical Job Description
- 1.2 Application For Employment
- 1.3 Interview Evaluation Form
- 1.4 Employment Agreement
- 1.5 Performance Evaluation Form

2. Forms for Financial Management
- 2.1 Invoice
- 2.2 Fee Calculation Sheet
- 2.3 Project Cost Control Chart
- 2.4 Time Report
- 2.5 Expense Claim Form
- 2.6 Purchase Order

3. Forms and Stamps for the Management of the Practice
- 3.1 Project Directory
- 3.2 Office Stamps

Sample Forms for the Management of the Practice

Guide to the Use of the Forms

Purpose of the Forms

The forms in this section of the Handbook are provided to assist the architect in the overall business administration or management of the practice. Standardized forms within an architectural practice are an essential management tool. Most architects customize forms for their own operations. Forms provided at the end of this chapter are examples of actual or suggested forms used by architectural practices in Canada for reference.

Office Manual

All employees should be familiar with the forms adopted by the practice and the architect should include the forms in an Office Manual (refer also to Chapter 2.1.5, *Office Administration*). Directions for the use of the forms, particularly for Time Reports and Expense Claim forms, should be included in the Office Manual.

Other Forms

This section provides samples of some of the basic forms used by most architectural practices. Certain practices may require other forms, including:

Other Forms for Human Resources Management

- **Job Description**
- **Application for Employment**
- **Interview Evaluation Form**
- **Letter of Acknowledgement** (for job application)
- **Letter of Regret** (for unsuccessful job applicants)

Other Forms for Financial Management

- **Statement of Account** (outstanding invoices less payments)
- **Record of Drawing Reproductions**
- **Record of Telephone Calls** (long distance and fax charges)
- **Purchase Order**

Other Forms for Marketing

- **Letter of Introduction** (to prospective clients)
- **Typical Résumé** (for proposals)
- **Project Data Sheet** (for proposals)
- **Client Contact Data Sheet** (for marketing)

Refer to Chapter 2.4, *Sample Forms for the Management of the Project*, for Forms for General Communications, such as a Memorandum, Transmittal.

1. Forms for Human Resources Management

1.1 Typical Job Description

Purpose
Job descriptions:

- assist in recruiting staff and preparing advertisements;
- assist staff in understanding their responsibilities;
- clarify the organization of the practice and lines of reporting;
- assist in performance evaluation of staff;
- assist in identifying human resource overlaps or deficiencies within the practice.

Content
Job descriptions should contain the following basic information:

- job title or name of position;
- employment status (i.e., permanent, temporary, part-time, independent contractor, etc.);
- reporting and relationship within the architectural practice;
- description of duties and responsibilities;
- educational requirements;
- experience requirements;
- requirements for membership in professional or technical associations;

- special conditions of employment related to the position (special skills, travel requirements, languages, etc.).

1.2 Application For Employment

Note: Architects and others in the design and construction sector usually provide personal résumés or curricula vitae and an Application for Employment is not a common form used by architectural practices.

Purpose
An application form, which assists in recruiting new staff, also:

- helps analyze potential employees;
- provides a sample of the applicants' skills (e. g., presentation, use of language, organization);
- provides a database for office use.

Content
The Application Form should request the following information:

- name of position applied for;
- name and contact information (address, telephone and fax number, E-mail address);
- date;
- education;
- work experience;
- professional licence/registration and affiliations;
- references.

The Application Form may also request the following information:

- volunteer and community work experience;
- personal interests and hobbies;
- career goals;
- most current salary;
- fluency in languages.

In addition, the form may provide space for the interviewer's comments about the applicant.

Because human rights codes and employment standards acts are in effect in most provinces, Application Forms may NOT request the following information:

- age;
- marital status;
- family status (e.g., single parent);
- disabilities;
- record of offences;
- citizenship, race, ancestry, place of origin, colour, ethnic origin, or creed;
- sex or sexual orientation;
- record of offences.

Ensure that the application form complies with the requirements of the applicable province.

1.3 Interview Evaluation Form

This form can be appended to the Application Form; however, it may be preferable to separate the two forms for purposes of confidentiality.

Purpose
This form is used to make:

- a record of the interview;
- a record of the interviewer's personal notes and observations;
- an appraisal of the applicant.

Content
The Interview Evaluation Form should contain the following information:

- date of interview;
- name of applicant;
- name of interviewer;
- personal notes and observations;
- salary expectations;
- verification of references.

1.4 Employment Agreement

An employment agreement is also discussed in Chapter 2.1.7, *Human Resources*.

Purpose
The agreement:

- creates a contract;
- outlines terms and conditions of employment;
- identifies probationary periods, if any;
- prevents misunderstandings.

Content
A sample Employment Agreement is provided as a template.

Guide for the use of Form 1.4, Employment Agreement

1.4.1. *Names:* Identify the legal names of the employer and the employee at outset of the agreement.

1.4.2. *Probation:* Care should be taken in establishing the length of the probationary period. A three- to six-month period is typical.

1.4.3. *Termination:* The period of notice to be given by the employer to the employee must be carefully established. Verify what length of notice period is required in provincial legislation. For consistency, a common notice period should be established for all employees. A longer notice period for a senior employee, owing to contribution to the practice, might be considered.

This period of notice given by the employee to the employer must also be carefully established. However, consideration should be given to agreeing to a notice period the same as that from employer to employee. A longer notice period for a senior employee, owing to contribution to the practice, should be considered.

1.4.4. *Restrictive Covenant:* The employee should carefully consider this section. In a small or remote location, this clause (if the time period is too lengthy) may effectively prevent an employee from quitting and establishing his or her own architectural practice.

1.4.5. *Notice:* State the address for which official notice is to be sent for employer and employee.

1.4.6. *Date:* The Agreement is effective as of the commencement of employment. This date is identified above the witnessed signature of the employee and of the person with the authority to bind the employer. If the commencement of the term of employment differs from the term of the agreement, adjust article 1 "Term of Employment" accordingly.

Schedule A

1.4.7. *Position:* The employment position (i.e., job title or job description) should be indicated or described. Refer to 1.1, "Typical Job Description," above. Despite the use of a specific job title, it should be recognized that employees in many architectural practices may be called upon to undertake a wide range of tasks. If a job description is preferable to a title, a Schedule "B" could be created to describe the job requirements and then appended to the agreement. If this approach is used, cross-reference the Schedule at article A.1.

1.4.8. *Hours of Work:* Insert the hours of the length of the work day, start and end time, and duration of the lunch period and coffee breaks.

Suggested text: "A normal work day is _ _____ hours, beginning at _____ and ending at _____ , and includes a lunch period of _____ hour(s). A normal work week, excluding holidays and vacations, is five days, Monday to Friday inclusive. A normal work year is 52 weeks, including holidays and vacations."

1.4.9. *Vacation:* Insert the terms and duration of vacation. Verify provincial requirements for vacation periods. Normally, all other staff, other than architects or students of architecture, must receive at least two weeks vacation each year. For consistency between employees, a minimum two-week vacation should be given to all employees. Consideration of a longer vacation period for a senior employee is usual.

Suggested text: "A vacation with pay of _____ week(s) duration shall be provided each year. The employee shall obtain at least _____ week(s) advance approval from the employer of the dates of the vacation. Such approval shall not be unreasonably withheld."

An established formula for increasing the vacation period is recommended. Consistency between employees should be established. Additional vacation of one or two days per full year of employment — following an initial period of employment, with a limit to the maximum length of vacation time — might be considered.

Suggested text: "Additional vacation with pay shall be earned at the rate of _____ additional day(s) per _____ full year of employment following an initial period of _____ years, to a maximum of _____ days."

1.4.10. *Personal Leave:* Verify if your province has a legislated requirement for personal leave. One day of paid personal leave per month of employment to a maximum of twelve days is recommended.

Suggested text: "Personal Leave is provided for illness of the employee or dependant, emergency child care, religious observances or for other needs of a personal nature. Personal Leave is not to be used as vacation time. The employee shall accumulate days for personal leave at the rate of _____ day(s) per full month of employment to a maximum of _____ day(s). The employer shall/shall not compensate the employee for unused days of personal leave at the termination of the employee's employment."

(Strike out "shall" or "shall not" to reflect the practice's policy.)

1.4.11. *Bereavement Leave:* An office policy of leave of absence for an employee's bereavement due to a death in the family should be set out to avoid awkwardness of administration at a difficult time.

1.4.12. *Benefit Plan/Profit-sharing Plan:* Check appropriate box and add Schedule "C" if applicable.

1.4.13. *Professional Fees:* List groups, such as the provincial or territorial association of architects or the Royal Architectural Institute of Canada, in which the employee is expected to maintain membership.

(Strike out "shall" or "shall not" to reflect compensation policy.) If membership in a professional association is a condition of employment, the employee should be compensated by the employer for the fees and dues.

1.4.14. *Performance Evaluation:* Fill in the month. A yearly performance evaluation is recommended. It may coincide with the month of start of employment, the year-end of the business or other convenient time. (Refer also to 1.5, "Performance Evaluation Form.")

1.4.15. *Career Development:* Identify the terms of career development. This section may also be used to address the needs of intern architects to gain specific experience in order to complete the Canadian Experience Record Book.

Suggested texts: "The employer will/will not compensate the employee for the cost of employer-approved career development courses."

(Strike out "will" or "will not" to reflect the practice's policy.) "The Employer may compensate salary, tuition, travel, accommodation, and other related expenses of professional development courses provided advance approval of the employer is granted."

"The employer recognizes that the employee is an intern architect seeking the work experience necessary to obtain licensure. The employee shall provide the employer with an Education Plan which identifies areas of needed work experience and a method of obtaining that experience. The Education Plan shall be reviewed and updated quarterly. The employer will assist the employee, as much as reasonably possible within the workload and nature of the practice,

to gain the required experience. The employee acknowledges that the workload and nature of the practice may not be able to accommodate all required experience."

1.4.16. *Compensation:* Identify the monetary compensation, hourly rate or yearly salary as applicable, deductions, and pay period.

Suggested texts: "The employer shall compensate the employee on the basis of an hourly rate of $_____ /hour of work."

"The employer shall compensate the employee on the basis of a yearly salary of $_____ ."

"The employer shall make all necessary statutory deductions and provide the employee with a statement of pay and deductions at each pay period."

"The employer shall pay the employee on a weekly/bi-weekly/twice monthly/ monthly basis, commencing on _____ ."

1.4.17. *Overtime:* Identify extent of overtime that may be required as a condition of employment. Identify the compensation for overtime work.

Overtime work at one and one-half times the regular rate, for work in excess of 44 hours per week, is the typical requirement. **This should be verified with provincial legislation and regulations.**

Suggested alternative texts:
"The employee shall be paid for each hour worked in excess of _____ hours in any standard week, at an hourly rate of $_____ /hour."

"The employer shall compensate the employee for unpaid overtime work by granting one hour paid leave for each hour of overtime work."

"The employee shall be paid for each hour in excess of _____ hours in any standard week at a rate of _____% of the standard hourly rate."

"The employer will not compensate the employee for overtime work. The employee at his or her own discretion shall provide unpaid overtime work from time to time when essential to provide a professional level of service to the employer's client. Notwithstanding, unpaid overtime work shall not exceed _ _____ hours per standard work week or _____ hours per year."

1.4.18. *Expenses:* Identify out-of-pocket expenses for which the employee will be compensated, and reimbursement procedure (e.g., travel, mileage at _____ /km, long distance charges, etc.).

1.4.19. *Equipment:* Identify the equipment and supplies to be provided by the employer and the employee, respectively (e.g., computers, cellphones or PDAs, safety boots, construction helmet, cameras).

1.4.20. *Other Conditions:* Identify other relevant conditions of employment such as religious holidays not covered by the usual statutory holidays, use of the employee's vehicle, computer use, variation in hours of work (e.g., flex-time, different office hours in summer).

1.4.21. *Amendments:* Use amendments to change the agreement at a future date whenever terms or conditions change. Both parties must sign to acknowledge the change.

Review the agreement at least yearly concurrent with the Performance Evaluation.

1.5 Performance Evaluation Form

Refer also to Chapter 2.1.7, *Human Resources,* for information on Performance Reviews and Evaluation.

Purpose
This form:

- describes an employee's attributes;
- identifies career and professional goals;
- measures productivity;
- adjusts salary or pay scales;
- assists as a tool to improve performance.

Content
The content of this form varies, based on the approach of the architectural practice to employee performance evaluation. Some possible information includes:

- name of employee;
- existing job description;
- review of current workload;
- assessment of competency — the fulfilment of duties and responsibilities;
- communications and interpersonal relations;
- professional development or training;
- objectives:
  - a specific outcome or "deliverable";
  - a method of measurement;
  - a time frame for completion;
- signatures of employee and employer.

2. Forms for Financial Management

2.1 Invoice

The Invoice is the document which lists professional services rendered, together with prices and charges, based on the Client-Architect Agreement. The invoice should indicate the basis for the fee (fixed, percentage of construction cost, per diem, etc.), and provide an orderly calculation of the fees itemizing the services rendered and fees for same. In addition, reimbursable expenses may be included in the Invoice; however, some practices prefer to bill reimbursable expenses separately. Expenses may be supported by receipts or proof of the expense.

Contents
The invoice should contain the following information:

- name of client;
- date;
- project name and number;
- Business Number issued by Canada Revenue Agency (Goods and Services Tax [GST] number or Harmonized Sales Tax [HST] number);
- list of professional services rendered;
- fee earned for services rendered to date;
- list of reimbursable expenses (this may be a separate invoice or appended to the invoice);
- previous payments;
- appropriate taxes (such as GST, HST or TVQ);
- current amount due and payable.

Refer to the sample invoices in this chapter.

One example represents an invoice submitted at 60% of the completion of the construction contract. In the example, the estimated cost of construction at the design stage was $200,000; at the working drawing stage (construction documents phase), the estimate was $220,000. The successful bidder's tender of $218,000 was accepted, and Change Orders during the construction adjusted the contract amount to $226,000.

Additional services, billed hourly for design and documentation involved in the preparation of the Change Orders, are shown on the sample invoice (as per Schedule B, Additional Services, of *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six*). Only the contract administration services for the Change Orders are covered in the percentage fee which is based on the revised contract amount.

The architect's fee is 8%. The fee during the construction administration phase is applied to the current contract amount plus GST or HST (i.e., $226,000 + 5% GST = $241,820).

To facilitate payment, cash flow, and cost control, it is sometimes preferable to issue separate invoices for:

- fees for basic services;
- fees for additional services;
- reimbursable expenses.

Refer also to Chapter 2.1.4, *Financial Management*, and to Chapter 2.1.9, *Risk Management and Professional Liability*.

2.2 Fee Calculation Sheet

The practice must determine the costs of providing the necessary services before submitting a proposal or fee quotation. This form is sometimes called a fee forecast.

Purpose
A fee calculation sheet is necessary to:

- determine the payroll cost and other costs of providing the service;
- identify appropriate personnel and consultants for the service;
- assist in scheduling work within the office;
- assist in fee negotiations with the client.

Content
The sheet should provide the following information:

- project name and number;
- construction value for the project;
- list of professional services required;
- fee forecast:
  - payroll costs;
  - consultants' fees;
  - overhead and profit.

2.3 Project Cost Control Chart

This form can serve as a tool for tracking payroll costs related to a specific project.

Purpose
The form can be used as:

- a status report on each project;
- a performance evaluation tool;
- a reference for future fee calculations;
- a warning to indicate when payroll costs have exceeded the budgeted amount;
- a project planning tool.

Content
The form should include the following information:

- project name and number;
- construction value of the project;
- percentage of architectural services completed to date;
- staff involved, including project manager;
- person-hours expended to date;
- budgeted person-hours remaining;
- payroll and other costs to date;
- fee billed to date;
- fee remaining;
- budget comparison (comparison with Fee Calculation Sheet).

2.4 Time Report

Time reports are a very valuable management tool and should be completed on a weekly basis by every partner, shareholder, and employee in the practice as well as by billable independent contractors.

Purpose
Time reports are:

- a basis for remuneration to employees and independent contractors;
- an historical reference for project scheduling and allocation of human resources;
- a record for monitoring payroll costs and scheduling;
- an evaluation tool for employee performance;
- a documented record of services and additional services provided to clients;
- a management tool for analysis of work activities;
- a record to assist in the completion of the *Canadian Experience Record Book* for intern architects.

Content
Every time sheet should include the following information:

- employee name (and number for larger firms);
- time period;
- project name and number;
- type of work activity;
- tabulation of daily and weekly activities by hours;
- employee and supervisor signatures.

2.5 Expense Claim Form

The use of the Expense Claim Form must be coordinated with the Office Manual to ensure that allowances for travel (rate per kilometre), meals, etc., are fair and current. Receipts for expenses are usually attached to the form in order to substantiate expense claims.

Purpose
Expense claim forms are used as:

- part of normal accounting records which may be subject to audit;
- a record to prepare invoices for reimbursable expenses;
- a management tool for project budgeting.

Content
Expense Claim Forms should include the following information:

- name of claimant;
- time period;
- approval signature (if required);
- purpose of expense;
- project name and number;
- itemized list of expenses (with receipts):
  - travel (mode, distance, and destination);
  - parking;
  - meals;
  - lodging;
  - other out-of-pocket expenses;
- amount of advances;
- total amount claimed;
- signature of claimant.

2.6 Purchase Order

This form is not normally used by architectural firms, although it may be common place in larger organizations or institutions where architects are employed.

Purpose
A Purchase Order creates a contract between the organization practice and the supplier. It also:

- outlines the terms and conditions of the purchase;
- helps control overhead costs within the firm;
- provides a record of material and equipment (reconciliation or a type of partial inventory).

Content
A Purchase Order Form should contain the following information:

- name of supplier and purchaser;
- purchase order number;
- method of shipment;
- quantity and description of product;
- unit price and total price, including taxes;
- conditions of purchase (warranties, support, delivery schedules, etc.);
- project name and number (if applicable).

Purchase order forms are often pre-printed and sequentially numbered to control purchases. Some organizations advise their suppliers that invoices will not be paid without an authorized purchase order.

3. Forms and Stamps for the Management of the Practice

3.1 Project Directory

The project directory, which includes all projects undertaken by the architectural practice, is helpful as:

- a list to use as a filing reference;
- identification of senior staff responsible for each project;
- a reference for the date of project commencement;
- a management tool;
- a financial management tool, if it provides the following additional information:
  - construction value;
  - indication of the percentage of completion for the project.

3.2 Office Stamps

Each architectural practice should prepare a series of electronic stamps or notes which are used to indicate the status of a document or drawing. In the past is was common to apply these notations using rubber stamps with a separate ink pad or self-inking stamps and this is still applicable for paper communications received by mail.

The following are some common stamps used in an architectural practice:

3.2.1 *Received/Routing Stamp*

Purpose
This stamp registers the date of receipt of all incoming documents (correspondence, trade journals, catalogues, transmittals, drawings, etc.).

This stamp can also be used to indicate the routing or circulation of the document.

Content
The following are two samples:

Logo or Name of Architectural Practice

Date Received:

File or Project No.:

Routing:

Action:

Logo or Name of Architectural Practice

Date Received:

File or Project No.:

Routing:

3.2.2 *Other Stamps*

Other useful stamps are illustrated below.



Logo or Name of Architectural Practice

Employment Agreement

This Agreement is made:

Between the Employer:

_____

and the Employee:

_____

The Employer and Employee agree as follows:

1. *Term of Employment*

   The employment of the Employee shall commence on the date of this agreement and continue for an indefinite term until terminated in accordance with the provisions of this agreement.

2. *Probation*

   The parties hereto agree that the initial _____ month period of employment under this agreement is "probationary" in the following respects:

   (a) the Employer shall have an opportunity to assess the performance, skills, and other employment-related attributes and characteristics of the Employee;

   (b) the Employee shall have an opportunity to learn about both the Employer and the position of employment;

   (c) either party may terminate the employment relationship at any time during the initial probationary period without advance notice or cause, in which case there will be no continuing obligations of the parties to each other, financial or otherwise.

3. *Compensation*

   In consideration of the services to be provided by the Employee hereunder, the Employee, during the term of employment, shall be compensated as set out in the attached Schedule "A" which forms a part of this agreement, less applicable statutory deductions.

4. *Termination of Employment*

   Subsequent to completion of the probationary term of employment referred to in paragraph 2 herein, the Employer may terminate the employment of the Employee at any time:

   (a) for cause at common law, in which case the Employee is not entitled to any advance notice of termination or compensation in lieu of notice;

   (b) without cause, in which case the Employer shall provide the Employee with advance notice of termination or compensation in lieu of notice equal to:

   _____ week(s), or _____ week(s) per full year of completed service with the Employer, whichever is greater, to a maximum of _____ weeks.

   The Employee may terminate his or her employment at any time by providing the Employer with advance notice of his or her intention to resign equal to:

   _____ week(s) plus _____ week(s) per full year of completed service with the Employer, to a maximum of _____ weeks.

5. *Restrictive Covenant*

   Following the termination of the employment of the Employee by the Employer, with or without cause, or by the voluntary withdrawal by the Employee from the Employer, the Employee shall, for a period of _____ month(s) following the said termination or voluntary withdrawal, within the province of _____ refrain from either directly or indirectly soliciting or attempting to solicit the business of any client of the Employer for his or her own benefit or that of any third person or organization. (For the purpose of this provision, a client means any active client or prospective client with whom the Employer was engaged or was pursuing engagement at any time during the period of two years prior to the date of termination.) The Employee covenants that he/she will refrain from either directly or indirectly attempting to obtain the withdrawal from the employment of the Employer of any other Employee of the Employer having regard to the same geographic and temporal restrictions. The Employee shall not directly or indirectly divulge any financial information relating to the Employer or any of its affiliates or clients to any person whatsoever. The Employee shall respect the Employer's copyright. The Employee shall not take any documents or materials of the Employer without written permission.

6. *Confidentiality*

The Employee acknowledges that, in the course of performing and fulfilling his or her duties thereunder, he or she may have access to and be entrusted with confidential information concerning the present and contemplated financial status and activities of the Employer, and that the disclosure of such confidential information to competitors of the Employer would be detrimental to the interest of the Employer. The Employee further acknowledges and agrees that the right to maintain the confidentiality of such information constitutes a proprietary right which the Employer is entitled to protect. Accordingly, the Employee covenants and agrees with the Employer that he or she will not, during the continuance of this agreement, disclose any of such confidential information to any person, firm or corporation, nor shall he or she use same, except as required in the normal course of his or her engagement hereunder, and thereafter he or she shall not disclose or make use of same.

7. *Assignment*

This agreement shall be assigned by the Employer to any successor employer and shall be binding upon the successor employer. The Employer shall ensure that the successor employer shall continue the provisions of this agreement as if it were the original Employer. This agreement may not be assigned by the Employee.

8. *Severability*

Each paragraph of this agreement shall be and remain separate from and independent of and severable from all and any other paragraphs herein except where otherwise indicated by the context of this agreement. The decision or declaration that one or more of the paragraphs are null and void shall have no effect on the remaining paragraphs of this agreement.

9. *Notice*

Any notice required to be given hereunder shall be deemed to have been properly given if delivered personally or sent by registered mail to:

Employer at

_____

_____

_____

Employee at

_____

_____

_____

10. *Indemnification*

The Employer hereby agrees to save harmless and indemnify the Employee, his or her heirs, executors, and administrators against any liability arising out of or in respect of any error, omission or negligent act in the performance by the Employee of professional services (other than intentional acts) on behalf of the Employer and to pay on the Employee's behalf out of the funds of the Employer all sums which the Employee becomes liable to pay as damages, interests, costs, fees and expenses, as a result of or sustained or incurred in or about any action, against the Employee or the Employer whether before or after the termination of employment and to defend the Employee in any such action, suit or proceeding at the expense of the Employer and to make no claim against the Employee with respect thereto for contribution or indemnity.

11. *Interpretation of Agreement*

The validity, interpretation, construction, and performance of this agreement shall be governed by the laws of the province of _____. This agreement shall be interpreted with all the necessary changes in gender and in number as the context may require and shall enure to the benefit of and be binding upon the respective successors and assigns of the parties hereto.

12. *Schedule "A"*

Compensation and general conditions of employment are appended to and form part of this agreement.

In witness whereof the parties hereto have read and understand this agreement and acknowledge that they have had the opportunity to obtain independent legal advice in respect of it and have duly executed this agreement as of _____.

_____

(witness) **(employer)**

_____

(witness) **(employee)**

SCHEDULE "A" COMPENSATION AND GENERAL CONDITIONS OF EMPLOYMENT

A.1 Position

The employment position is:

_____

A.2 Hours of Work

Hours of work are:

_____
_____
_____
_____
_____

A.3 Vacation with Pay

Terms of vacation are:

_____
_____
_____

Should the employment be terminated with vacation time earned but not taken, the Employer shall pay the Employee the vacation pay.

Terms of earning additional vacation with pay as the length of employment increases are:

_____
_____
_____

A.4 Public Holidays

The Employee is granted paid holidays for all statutory holidays, including New Year's Day, Good Friday, Victoria Day, Canada Day, August Civic Holiday, Labour Day, Thanksgiving Day, Christmas Day, Boxing Day, and _____ (adjust statutory holiday as per provincial law).

A.5 Personal Leave

Terms of personal leave are:

_____
_____
_____

A.6 Bereavement Leave

Terms of bereavement leave are:

_____
_____

A.7 Pregnancy and Parental Leave

Pregnancy and parental leave shall be granted in accordance with the requirements of the applicable provincial legislation.

A.8 Benefits Plans

❑ The Employer does not offer a benefit plan.

or

❑ The Employer offers the Benefit Plan described in the attached Schedule "C" for the Employee.

A.9 Profit Sharing

❑ The Employer does not offer a profit-sharing plan.

or

❑ The Employer offers the profit-sharing plan described in the attached Schedule "C" for the Employee.

A.10 Professional Fees

The Employee shall maintain membership in good standing in the following groups:

_____
_____
_____
_____

The Employer *shall/shall not* compensate the Employee the cost of maintaining membership in the foregoing groups.

A.11 Performance Evaluation

The Employer shall assess the Employee's performance at the end of the probationary period and annually thereafter during the month of _____. The Employer and Employee shall meet and discuss the Employee's performance, compensation, and other conditions of employment.

A.12 Career Development

Terms of career development are:

A.13 Compensation

Terms of compensation are:

A.14 Overtime Work

Terms of overtime work are:

A.15 Expenses

Terms of Reimbursement of Expenses are:

A.16 Equipment

A.17 Other Conditions

A.18 Amendments

Invoice

Name of Project: _____ **File #:** _____

Invoice: _____

O.C. 2402 — Class II Building
from $1,300,000 to $3,200,000

fee excluding expenses $86,582

Overall Work	**Fees: Basic Service**					$86,582	**1082**
	Estimated cost of work *including taxes under sec. 21*				$1,718,290		
	Fees: plans and specifications						
	for the first 1,300,00				$47,325		
	plus	3.19%					
	on remaining funds	$418,290			$13,343		
						$60,668	**758**
		Preliminary design	40%	$24,267			114 — 15% Preliminary Design
							190 — 25% Design Development
		Plans and specifications	60%	$36,401			455 — 60% Plans and Specs
	Fees: field review services						
	up to 1,300,00				$20,225		
	plus	1.36%					
	on remaining funds	$418,290			$5,689		
						$25,915	**324**
	Forseeable additional fees					$0	
	Surveys			maximum	$0	$0	
	Preparatory studies			maximum	$0	$0	
	Programming			maximum	$0	$0	
	Change order services			provision	$0	$0	
	Specialized equipment				$0	$0	
	Phasing (on fees for plans and specifications, and supervision)		0$	on	$86,582	$0	
	Eligible expenses					$0	
	Specific Expenses				$0	$0	
	Travel	O.C. rate		maximum	$0	$0	

Form 2.1 Sample A

Logo or Name of Architectural Practice

Invoice

To: Acme Co. Ltd.
77 Skyway Drive
Anytown, ON
Y2K 2Y2

INVOICE No.: 09094
Project: Acme Office Addition
Project No.: 09051
Date: 16 October 2009
GST No.: R109976007

For Professional Services Rendered:

- Reference: Client-Architect Contract
  RAIC Document Six, dated May 29, 1998

Fees to: 15 October 2009 • Earned to date:

Design	100% of 25% of 8% of $200,000	$4,000.00
Contract Documents	100% of 50% of 8% of $220,000	$8,800.00
Contract Administration Services	60% of 25% of 8% of $241,820	$2,901.84

Additional Services

Change Orders 1, 2, and 3
6 hours @ $180/hour = $1080
15 hours @ $75/hour = $1125
$2,205.00

Total fee earned to date	$17,906.84
Less previously invoiced	$16,084.76
TOTAL FEE DUE THIS INVOICE	$1,822.08
Reimbursable expenses due (excluding GST) (see Schedule A attached)	$104.60
Sub-total	$1,926.68
GST	$96.33
TOTAL DUE THIS INVOICE	$2,023.01

Logo or Name of Architectural Practice

Schedule A

Invoice (continued)

To: Acme Co. Ltd.
77 Skyway Drive
Anytown, ON
Y2K 2Y2

INVOICE No.: 09094
Project: Acme Office Addition
Project No.: 09051
Date: 16 October 2009
GST No.: R109976007

Reimbursable Expenses:

- Previously invoiced $754.55

- Current Expenses

Travel	$26.50
Photocopies (39 @ $0.15 ea)	$5.85
Printing (11 prints @ $1.25 ea)	$13.75
Long distance calls	$27.66
Postage and delivery	$17.20

- Sub-total $90.96
  Administrative charges (15% of $90.96) $13.64

Total Expenses to date	$859.15
Expenses due this invoice	$104.60

Logo or Name of Architectural Practice

Fee Calculation Sheet

Project No.: **Date:**

Client:

Sub-consultants

DISCIPLINE	Firm NAME	FEE
Structural		
Mechanical		
Electrical		
Other		
	Sub-total	

In-house Costs

PHASE	HOURS and Rate*	Payroll Cost	Sub-total
Pre-design	1.		
	2.		
Schematic Design	1.		
	2.		
Design Development	1.		
	2.		
Construction Documents	1.		
	2.		
	3.		
	4.		
Bidding & Contract Negotiations	1.		
	2.		
Construction Administration	1.		
	2.		
Post-construction	1.		
Other	1.		
Total Payroll Cost			

Other costs

Sub-consultant's fees

TOTAL FEE Estimate

Comparison with percentage fee of construction cost:

Estimated Construction Value:

**Hourly rates include overhead and profit*

Logo or Name of Architectural Practice

Project Cost Control Chart

Project: Addition & Renovations to Brooks Clinic

Project No.: 09-07

Date: December 09

Fee available to project (budget): $117,070.00

CODE	ACTIVITY	%	DOLLARS	HOURS	$/HOUR
1.	Pre-design/meetings	0.0%	$0	0	$125.00
2.	Programming/analysis	0.0%	$0	0	$0.00
3.	Schematic Design	15.0%	$16,800	168	$100.00
4.	Design Approvals	0.0%	$0	0	$100.00
5.	Design Development	15.0%	$16,800	168	$100.00
6.	Construction Documents	45.0%	$53,635	631	$85.00
7.	Specifications	0.0%	$0	0	$85.00
8.	Building Permit/Approvals	0.0%	$0	0	$85.00
9.	Tendering/Negotiations	5.0%	$5,950	70	$85.00
10.	Contract Administration	20.0%	$23,885	281	$85.00
11.	Client Revisions	0.0%	$0	0	$85.00
12.	Extra Services	0.0%	$0	0	$85.00
13.	Post-construction/occupancy	0.0%	$0	0	$85.00
14.	Construction/Management	0.0%	$0	0	$85.00
15.	Estimating	0.0%	$0	0	$85.00
16.	Interior Design	0.0%	$0	0	$85.00
17.	Drawing and Document Assembly	0.0%	$0	0	$85.00
18.					
19.					
20.					
TOTALS		100.0%	$117,070	1,318	

Logo or Name of Architectural Practice

Time Report

Name: John Doe **No.:** 164 **Dept.:** Production **Week Ending:** 15 Oct. 09

Project:	Project No.:	Activity Code:	Sat.	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Total
Statutory Holiday		2			7½					7½
ACME Offices	99-175	8				5	4	1	7½	17½
		9					3			3
	99-175	13					1½			1½
Miller Addition	99-192	6				2½		2		4½
Tyler Clinic	99-164	10						6		6
Regular					7½	7½	7½	7½	7½	37½
Overtime							1	1½		2½
Total					7½	7½	8½	9	7½	40

Activity Codes

1. Illness/Absent
2. Vacation/Holiday
3. Office Overhead
4. Promotion
5. Pre-design/Requirements
6. Schematic Design
7. Design Development
8. Working Drawings
9. Specifications
10. Contract Administration — Office Functions
11. Contract Administration — Field Functions
12. Post-construction
13. Additional Services

Signature of employee

Signature of supervisor

Logo or Name of Architectural Practice

Expense Claim Form

Claimant: John Doe **Period covered by report:**

Approved by: **From:** 1 Sept. 08 **To:** 31 Oct. 08

Date:	Project No.:	Details:	R*	Expense
21 Sept. 08	08-034	Travel to site, 20 KM @ .32¢/KM	R	6.40
23 Sept. 08	08-034	Travel to Millwork shop to		
		inspect cabinets, 35 KM @ .32¢/KM	R	11.20
28 Sept. 08	08-032	Travel to site, 15 KM @ .32¢/KM	R	4.80
4 Oct. 08	08-075	Plane fare to Ottawa	R	368.50
4 Oct. 08	08-075	Lunch		9.50
4 Oct. 08	08-075	Taxi	R	6.75
5 Oct. 08	08-164	Travel to site, 20 KM @ .32¢/KM		6.40
5 Oct. 08	08-175	Travel to ACME, 25 KM @ .32¢/KM		8.00
			Total	**$** 421.55

R*: Recoverable from Client. Invoice reimbursable expenses for this amount.

Settlement:

Personal Charges: Magazine Renewal	$ 18.00
Temporary Advance: Plane Ticket Plus $20.00	$ 388.50
Subtracted from Expenses:	$ 406.50
Payment:	**$** 15.05
Cheque No.:	

2.3.1 Management of the Project



Canadian Handbook of Practice for Architects

2.3.1

Introduction

Project Organization
- In-house Teams

Role of the Project Manager
- Client-Architect Agreements
- Project Cost Control
- Coordinating Engineers and Other Consultants
- Communications

Scheduling the Project

Project Closeout
- Project Evaluation
- Record Drawings
- Archiving
- Firm Database
- Promotional Documentation

Use of the "Checklist for the Management of the Architectural Project"

References

Appendix — Characteristics of an Effective Project Manager

Checklist for the Management of the Architectural Project

Management of the Project

Introduction

Effective management of the project is an essential element of good professional practice.

This chapter describes the role of the project manager (also called a project architect or design team leader) — the person in an architect's office who directs and administers an architectural project. Sometimes the project manager may be the principal or partner-in-charge or they may report to the principal or partner-in-charge.

This chapter does **not** cover:

- *project management* as a separate professional service or form of delivery;
- *construction management* as a form of project delivery.

These topics are discussed in Chapter 2.3.2, *Types of Construction Project Delivery*.

The project manager may be a senior architect or other individual (preferably an architect) with experience in the practice of architecture and management.

Refer to "Appendix — Characteristics of an Effective Project Manager" at the end of this chapter.

Refer also to the standards of the Project Management Institute which provide a structured methodology for project management at www.pmi.org

Project Organization

Good project management means:

- selecting and managing people, including in-house staff and outside consultants;
- ensuring continuous and effective communications;
- delegating tasks appropriately;
- arranging and managing meetings;
- controlling and managing design changes;
- managing time effectively;
- scheduling, estimating, and project control.

In-house Teams

For small projects, project managers may carry out several of the tasks themselves. For large and complex projects, several people participate in the same task. The project manager must identify the manpower and skills required, and must also constantly direct and motivate the in-house team. The composition of the team is the key factor in achieving both architectural and financial objectives.

The team may include the project manager and several architects, intern architects and technicians. More complex projects or very specialized services (such as acoustics, vertical transportation systems, architectural conservation, and wind studies) often require hiring outside experts.

Role of the Project Manager

The project manager is a leader responsible for:

- ensuring that the project proceeds through successive stages from program approval to project implementation;
- keeping the project on time and within budget;
- managing the progress of the project by:
  - directing an internal team;
  - directing and coordinating the contribution of engineers and other consultants;
  - achieving the firm's financial objectives;
- providing proper project closeout.

Client-Architect Agreements

The project manager should review the client-architect agreement before starting work.

It is preferable to use either the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six* or the *Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: RAIC Document Seven*, because:

- these agreements are widely recognized and accepted;
- the architect's and the client's responsibilities are clearly defined;
- they clearly identify the scope of work by distinguishing between Basic Services and Additional Services.

The prudent project manager will review the terms of the agreement, to fully understand the scope and limitations of the consulting services to be provided. This should forestall later misunderstandings or unreasonable expectations. The project manager should identify when any increase in fees as a result of additional services is warranted and then consult with the principal or partner-in-charge and assist in any adjustment to fees.

Refer to Chapter 2.1.9, *Risk Management and Professional Liability,* for more detail on client-architect agreements.

Project Cost Control

Generally, at the beginning of a project, the client will prepare an overall project budget. The project manager's goal is to:

- manage the results of the design team;
- administer the design and construction of the best possible project within the available funds;
- achieve the firm's financial objectives (profit margin) for the project.

Refer to Chapter 2.3.3, *Cost Planning and Control*, for information on planning and controlling costs for a specific project. Refer to Chapter 2.1.4, *Financial Management,* for controlling costs within the architectural office.

Coordinating Engineers and Other Consultants

Usually the "design team" has already been selected when the commission is awarded. Refer to Chapter 1.2.3, *Consultants,* regarding the role of consultants and agreements with consultants. Refer to Chapter 2.1.9, *Risk Management and Professional Liability,* for issues to consider when assembling the design team.

The project manager is responsible for:

- providing engineers and consultants with all information promptly and clearly in order to optimize their participation;
- ensuring that their designs and specifications are properly coordinated;
- maintaining morale as well as ensuring the respect and recognition of all consultants.

Communications

Managing communications throughout the entire project is crucial to its success. Good communications require the efficient and effective management of:

- meetings;
- telephone communications;
- electronic and paper messages such as correspondence, memos, E-mail;
- record-keeping, such as meeting minutes, notes, project files, and other documentation.

Refer also to Chapter 2.1.6, *Communications*.

Scheduling the Project

Project schedules are planning tools that help project managers and teams organize various defined tasks in order to meet deadlines or dates which may be set out in an agreed-upon schedule or in the contract. In addition, schedules help to monitor tasks until the project is complete. Although many different scheduling techniques are available for many types of projects, the project manager must select a method which can be adapted to the scale and complexity of the work.

Simple bar charts and milestone charts are usually appropriate for scheduling architectural projects. However, for complex projects with many teams and tasks, refer to the scheduling techniques outlined in "Appendix — Project Management" in Chapter 2.3.2, *Types of Construction Project Delivery*.

Project Closeout

Project Evaluation

The firm should assess whether the project has achieved its financial and professional objectives. This might include an external evaluation with the client. The project manager should analyze the project and, if the objectives were not met, determine why and suggest corrective action for future projects.

Record Drawings

If engaged for this service, the project manager will oversee the preparation of CAD record drawings for the client based on the contractor's "mark-ups" which show changes made to the construction documents. Also, the project manager should return to the client any documentation, such as construction drawings and specifications, which was provided as reference for the design of renovations or additions to an existing building.

Archiving

Project documents, including all electronic communications and record drawings, should be kept and filed so that they may be readily and quickly retrieved if they are needed for other projects or must be consulted in the event of a claim.

Firm Database

The project manager should extract any information which could be used to develop a database for future work, such as the preparation of construction cost estimates, or for re-usable construction details or specifications.

Promotional Documentation

Based on some of the project documents (such as sketches, perspectives, plans, and photographs) and data, project managers should prepare a "project record" or "project data sheet" that can be added to the firm's portfolio for future use. This record should highlight the project's special features and main challenges, as well as demonstrate the architect's contribution to its success. Refer also to Chapter 2.1.3, *Public Relations and Marketing*.

Use of the "Checklist for the Management of the Architectural Project"

A "Checklist for the Management of the Architectural Project" has been provided at the end of this chapter. The checklist is based on the Ontario Association of Architects former Practice Bulletin Number 67, *Architect's Project Progress Record*. The document has been reformatted, references to provincial terms have been modified, and minor editorial improvements have been included.

Although the design and management of architectural projects are not necessarily linear nor quantifiable, this checklist can assist the architect in scheduling and recording the status of principal tasks during the course of a project.

References

The American Institute of Architects (AIA) and David S. Haviland. Washington, D.C.: The AIA Press.

Managing Architectural Projects: Three Case Studies. 1981.
Managing Architectural Projects: The Effective Project Manager. 1981.
Managing Architectural Projects: The Project Management Manual. 1984.

Demkin, Joseph A., executive editor. *The Architect's Handbook of Professional Practice*. The American Institute of Architects. Hoboken, New Jersey: John Wiley & Sons, Inc. 2008.

Project Management Institute. A Guide to the Project Management Body of Knowledge –Third Edition. Project Management Institute, 2004.
www.pmi.org

Appendix — Characteristics of an Effective Project Manager

Whether a principal or an employee, the effective project manager:

- attacks aggressively every problem on design projects;
- is organized: plans, organizes, directs, and controls the entire project;
- is enthusiastic about achieving high design standards, budget control, and schedule performance for the client;
- delegates well;
- communicates well with each person on the team and with the client and other people outside the firm;
- motivates the staff to perform so that project goals are met;
- has the ability to modify a project so that it can meet a client's changing goals;
- is results-oriented, keeping the final outcome of the project in mind at all times and achieving every goal that has been established;
- knows that it takes an entire architectural design team to accomplish the greatest possible results on a project and gives proper credit to the design team;
- listens well to both team members and others involved in a project in order to interpret clearly their objectives and opinions;
- can convince clients and team members of the right way for the project to proceed and can persuade others in a pleasing and nonbelligerent manner;
- always has a conscious sense of time: knows exactly how much time it takes to accomplish a task and how much time is left to accomplish remaining tasks;
- is capable of managing multiple projects without letting the requirements or details of any one project fall through the cracks;
- knows where to find the answers for all technical problems and can converse intelligently with clients, internal team members, and external building officials and consultants about any aspect of the project.

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Checklist for the Management of the Architectural Project

Periodic Tasks to be undertaken throughout every phase of the Project

TASK/PHASE	Pre-agreement	Schematic Design	Design Development	Construction Documents	Bidding and Negotiating	Contract Administration	Post-construction
Review and update project schedule							
Maintain project accounting records							
Review internal office budget							
Submit monthly or periodic invoices to client							
Update project directory							
Update project brief							
Review and approval by Authorities Having Jurisdiction							
Review and coordinate with consultants							
Update estimate of construction cost							
Obtain client approvals							

Pre-agreement	Schematic Design	Design Development	Construction Documents	Bidding and Negotiation	Contract Administration	Post-construction

Checklist for the Management of the Architectural Project

Tasks for each phase of the project

I Pre-agreement Phase

Upon receipt of notification from a prospective client, undertake the following tasks prior to a submission or execution of an agreement.

1.	**Determine if other architects are or were involved with the project.**		
	If "yes," comply with provincial association requirements.		
	Address issues pertaining to copyright, credits, liability.		
2.	**Assign project number.**		
3.	**Determine scope and type of project.**		
4.	**Verify ability to provide professional services, including professional liability insurance requirements and licensing.**		
5.	**Determine if the client is financially sound.**		
6.	**Make preliminary assessment of project viability:**		
	• special considerations		
	• financing		
	• economics		
	• social or community groups		
	• zoning/development approval		
	• environmental impact		
	• heritage designation		
	• Sustainable targets		
	• other		
7.	**Determine required professional services.**		
8.	**Determine type of professional services agreement:**		
	• Standard Form of Agreement (Document Six)		
	• Abbreviated Version of Agreement (Document Seven)		
	• client's contract		
	• identify special provisions which may require input of legal counsel or professional liability insurers		
9.	**Ascertain method of construction contract.**		
	.1 Traditional Bid Process:		
	• single bid package		
	• multiple bid packages (how many?)		
	• direct selection by the client		
	• invited bidders		
	• open bidding		
	.2 Construction Management		
	.3 Design-Build		
	.4 other		

10. Review the client's budget and resources.		
Determine if budget includes:		
A. General		
• land or site acquisition		
• demolition		
• renovation		
• real estate fees		
• legal fees and/or title search		
• legal survey		
• environmental audit		
• environmental remediation		
• financing		
• property taxes, levies, etc.		
• project management fees		
• professional fees (architecture and engineering)		
• permits		
• estimated construction costs:		
• off-site utilities		
• on-site utilities		
• demolition		
• base building		
• tenant improvements		
• furniture/equipment		
• landscaping		
• items purchased by the client		
• allowances:		
• artwork		
• hardware		
• interior finishes (e.g., carpet)		
• exterior finishes (e.g., brick)		
• landscaping		
• service connection costs		
• other		
B. Authorities Having Jurisdiction		
• official plan amendment		
• zoning or land use amendment		
• bylaw variance or development appeal		
• site plan agreement		
• demolition permit		
• construction permit(s)		
• municipal/regional fees (utility connections, park levies)		
• other		
C. Consultants' Fees		
• planning		
• civil engineering		
• architecture		
• structural		
• mechanical		
• electrical		
• landscape architecture		
• interior design		
• cost consultant or quantity surveyor		
• other		
D. Special Consultants' Fees		
• acoustical		
• architectural conservation		
• arborist		
• art		
• building code		
• building envelope		
• commissioning		
• construction management		
• energy		
• environmental contaminate		
• food service		
• furniture/equipment		
• geotechnical		
• hardware		
• marketing		
• security		

D. Special Consultants' Fees (continued)		
• seismic		
• signage — graphics		
• special lighting		
• surveyor		
• sustainability		
• traffic		
• wind/snow studies		
• other		
E. Miscellaneous costs		
• contingency		
• inspection and testing:		
• soil		
• concrete		
• steel		
• roofing		
• asphalt paving		
• building audit (condominiums)		
• other		
• adjacent building damage survey		
• geotechnical report/inspection		
• models/professional renderings		
• full-size mock-ups		
• inflation		
• financing costs		
• client disbursements		
• consultant disbursements		
• other		
F. Insurance		
• excess professional liability		
• property damage		
• builder's risk insurance		
• other		
11. Determine the client's requirements for:		
• approvals		
• CADD		
• unit of measurement (imperial/metric)		
• language translation		
• other		
12. Determine whether project budget, project time schedule, and project program are compatible.		
13. Organize teams (structural, mechanical, electrical, and special consultants).		
Negotiate tentative compensation in accordance with basis of services determined above.		
Verify consultants' abilities to meet the client's requirements:		
• time schedule		
• liability insurance		
• licensing requirements		
• construction cost estimates		
• other		
14. Prepare project estimate in accordance with agreement:		
• internal office budgets		
• production schedules		
• personnel		
15. Determine fee (refer to Form 2.2, Fee Calculation Sheet, in Chapter 2.2).		
16. Prepare and forward interim Letter of Agreement.		
17. Prepare client-architect agreement and forward to the client for review.		
Direct legal counsel and professional liability insurer (as appropriate) to review any modifications or specific provisions required by the client.		
18. Review final agreement with own legal counsel and professional liability insurer (if necessary). Approve any modifications made by the client, or renegotiate.		
19. Verify authority of party signing for the client (required for public agency, institutional, and corporate clients).		
20. Execute the agreement.		
21. Prepare project directory (refer to Form 1.5, Project Team Directory, in Chapter 2.4).		

II Schematic Design Phase

Part A — *Tasks prior to starting the schematic design phase*

1. Obtain name of the client's authorized representative.		
2. Obtain the client's project brief.		
Confirm the client's space needs and other program requirements.		
3. Establish project filing system.		
4. Assign personnel to the project:		
• project architect		
• designer		
• technical staff		
• other		
5. Assemble and review all applicable requirements of Authorities Having Jurisdiction (e.g., site plan control, applicable zoning or land use, and code requirements).		
Review with Authorities (refer to Chapter 1.2.4).		
6. Establish project schedule, including completion dates for each phase of project.		
Advise the client, staff, and all consultants.		
7. Finalize Consultant Agreements **Negotiate, prepare, and execute consultant agreements. When required, obtain the client's approval of consultants:**		
• structural		
• mechanical		
• electrical		
• other		
Request and receive from each consultant proof of professional liability insurance coverage:		
• structural		
• mechanical		
• electrical		
• other		
Request and receive from each consultant proof of professional liability insurance coverage:		
• structural		
• mechanical		
• electrical		
• other		
8. Distribute copies of pertinent portions of client-architect agreement to staff and consultants who require copies.		
9. Distribute copies of pertinent portions of consultant agreements to staff members who require copies.		
10. Confirm unit of measurement:		
• imperial		
• metric		
11. Obtain, from the client, the following surveys:		
• legal		
• topographical		
• other		
Assist the client in securing surveys when necessary.		
Advise the client to obtain adjacent building condition survey when necessary.		
12. Obtain the consultants' requirements for investigation and testing necessary for proper execution of their work and request approval from the client.		
Assist the client in securing proposals for this work.		

Part A — *Tasks prior to starting the schematic design phase* (continued)

13. Instruct consultants to review site information and report: • structural		
• mechanical		
• electrical		
• civil		
• other		
14. Instruct appropriate staff members and other consultants to review site information and examine site.		
Instruct appropriate staff and consultants to review and record existing conditions for existing building.		
15. Determine preliminary space requirements (area and volume) using the client's functional program.		
16. Prepare functional program, if part of architectural services.		
17. Review functional program with the client to determine if construction budget and program are compatible.		
18. Obtain the client's written authority to proceed.		

Part B — *Tasks to be started after completion of Part A*

1. Initiate project brief.		
2. Review all assembled data, including program, budget, requirements of Authorities Having Jurisdiction, site data, and special requirements.		
3. Prepare functional space diagrams.		
4. Provide consultants with pertinent program data and functional space requirements.		
5. Receive and review results of all investigations and tests, including geotechnical reports and analyses.		
Request additional information, if necessary.		
Forward final information to appropriate consultant(s).		
6. Confer with consultants to determine systems to be used in the project.		
Obtain analyses of comparative systems, with recommendations.		
Obtain space and location requirements for selected systems, after review and acceptance by the client.		
7. Prepare schematic design documents in compliance with applicable codes, including: • site plan		
• principal floor plans		
• building sections		
• general descriptive views (elevations)		
• illustrative sketches, models or renderings		
• other		
8. Identify all documents with project number and date, and name of the practice.		
9. Calculate areas and volumes.		
Analyze plan efficiency and applicable net-to-gross ratios.		
10. Update project brief to include system and equipment descriptions.		
11. Obtain from each consultant an estimate of construction cost for their system or components: • structural		
• mechanical		
• electrical		
• civil		
• other		
12. Prepare written estimate of construction cost based on all available data. Include appropriate contingencies.		
13. Submit schematic design documents, including drawings, project brief, calculations, and estimate of construction costs to the client.		
14. Obtain the client's written authorization to proceed to design development phase, and funding agency approval where applicable.		

III Design Development Phase

Part A — *Tasks prior to starting the design development phase*

1. Review schematic design checklist to ensure phase completion and that all required data have been obtained.		
2. Have the client provide any additional requirements and confirm in writing.		
3. Assist the client in obtaining models, perspectives or professional renderings when requested.		
4. Review program and verify compliance.		
5. Review schematic documents for compliance with all applicable codes and regulations.		
6. Select additional consultants, if required, and establish contractual relationship.		
Obtain the client's written approval as required.		
7. Review all other data received from the client, consultants, etc.		
Request additional data if necessary.		
8. Obtain the client's standards and requirements, if any, for drawings and for other material.		
Check against requirements of Authorities Having Jurisdiction.		
9. Develop and forward to consultants, or alternatively obtain from consultants, a list of specialized systems required, such as:		
• cable TV		
• clock		
• closed circuit TV		
• compressed air		
• electronic or communication systems		
• energy management system		
• fire suppression systems		
• gas		
• intercom		
• lighting		
• lightning protection		
• oxygen		
• photovoltaic		
• pneumatic tube		
• remote control operations		
• security		
• steam		
• telephone		
• vacuum		
• voice communication		
• waste recycling and storage		
• other		
Obtain the client's approval of list and notify consultants of approval or revisions.		
10. Define occupancy load for each area and forward to consultants.		
11. Instruct the structural consultant to investigate and confirm in writing a review of applicable codes and regulations.		
12. Instruct the mechanical and electrical consultants to: • contact utility companies and public authorities regarding all services, and receive written approval for all service connections;		
• investigate and confirm in writing their review of all applicable public and utility regulations;		
• review architectural and structural schematic drawings to establish adequate provision for specialized systems;		
• prepare estimates of operating costs with recommendations.		
13. Review the consultants' estimates of operating costs and forward to the client.		
Obtain the client's approval of selected energy source.		

Part B — *Tasks during the design development phase*

1. Prepare site plan indicating building location(s) and site improvements.		
2. Prepare all other necessary drawings:		
• plans		
• elevations		
• sections		
• schedules		
• other		
3. Prepare area calculations (net and gross) and volume calculations, including site coverage and density, as defined in zoning/land use regulations.		
4. Prepare preliminary or outline specifications:		
• architectural		
• structural		
• mechanical		
• electrical		
• civil		
5. Instruct consultants to prepare layouts and drawings as required to illustrate and describe their portion of project:		
• architectural		
• structural		
• mechanical		
• electrical		
• civil		
6. Obtain detailed cost estimate, if specifically authorized by the client as part of architectural services:		
• architectural		
• structural		
• mechanical		
• electrical		
• civil		
7. Direct each consultant to prepare an estimate of construction cost for their discipline:		
• architectural		
• structural		
• mechanical		
• electrical		
• civil		
8. Update estimate of construction cost.		
9. Submit design development documents, including drawings, outline specifications, and updated estimate of construction cost to the client.		
10. Have the client confirm type of construction contract required.		
11. Obtain the client's written approval of design development documents.		
Revise as required.		
12. Obtain the client's written authorization to proceed to construction documents phase.		
Verify, where applicable, that all authorities and agencies have given authorization to proceed.		

IV Construction Documents Phase

Part A — *Tasks prior to starting the construction documents phase*

1. Review checklist for previous phase to ensure completion.		
Review program and verify compliance.		
2. Review design development documents for compliance with applicable codes and regulations.		
3. Select additional consultants, if required, and establish contractual relationships.		
Obtain the client's approval as required.		
4. Determine scope of drawings, including selection of software, schedule of required drawings, sequence of drawings, information to appear on each sheet, scale, and sheet size, etc.		
Review requirements of the client and authorities.		
5. Determine method of production drawing set.		
Determine drawing requirements for type of construction procurement (bid, multiple bid, Design-Build).		
6. Develop title block format and layering system.		
Check the client's requirements.		
7. Establish check set review schedule with client, consultants, and authorities.		

Part B — *Tasks during the construction documents phase*

1. Prepare final specifications and drawings to include plans (including site plan and landscaping), elevations, sections, details, notes, dimensions, and schedules, and require all consultants to do the same.		
2. Arrange for preparation of finish hardware schedule, if required.		
3. Identify components requiring alternate prices.		
4. Determine acceptable alternatives to specified materials or systems.		
5. Identify components requiring unit prices.		
6. Determine required cash allowances:		
• testing allowance		
• contingency		
• utility connections		
• other		
7. Prepare colour and finish schedules.		
8. Prepare testing and quality control program budgets, and assist the client in selection of testing agencies.		
Determine if these costs are to be included in the construction contract.		
9. Obtain the client's instructions regarding application and payment of necessary permits such as building, etc.		
10. Obtain the client's instructions regarding insurance and bonds.		
11. Obtain the client's instructions regarding construction contracts and bidding procedures.		
12. Obtain the client's requirements for phased occupancy or other special requirements.		
13. Determine items or work to be furnished by the client, or not to be included in the construction contract.		
14. Review, with the client, the schedule for delivery and installation of client-furnished materials.		
15. Review bid period in project schedule.		
Determine time, date of bid closing, and place of bid receipt.		
16. Prepare and assemble specifications concurrently with preparation of drawings. Include:		
• notice to bidders		
• advertisement or invitation to bid		
• instructions to bidders		
• bid form		
• construction contract		
• General Conditions		
• Supplementary Conditions		
• cash allowances		
• other		

Part B — *Tasks during the construction documents phase* (continued)

17. Submit copies of General Conditions and Supplementary Conditions for the client's review or obtain the client's specific contract requirements.		
18. Assist the client's legal counsel or representative, if necessary, with review of:		
• General Conditions		
• Supplementary Conditions		
• form of construction contract		
19. Check completed documents for coordination, compliance with program, accuracy, and cross-coordination with consultants' work.		
Direct the consultants to carry out required coordination:		
• architectural		
• structural		
• mechanical		
• electrical		
• other		
20. Revise documents as required after check and instruct consultants to do the same:		
• architectural		
• structural		
• mechanical		
• electrical		
• other		
21. Prepare final calculations of net and gross area, and volume.		
22. Obtain from each consultant further update of estimate of construction cost:		
• architectural		
• structural		
• mechanical		
• electrical		
• other		
23. Prepare final estimate of construction cost.		
24. Submit drawings, specifications, estimate of construction cost, and building calculations and analyses to the client for review.		
Obtain the client's written approval.		
Revise as required.		
25. Review list of potential contractors with the client.		
26. Obtain qualification statements, if required, from interested bidders and review.		
Obtain assistance from consultants if separate prime contracts are to be awarded.		
27. Stamp documents for intended purposes (e.g., bid, building permit, construction).		
Affix the architect's seal and signature and date on documents. Ensure that consultants seal, sign, and date documents:		
• architectural		
• structural		
• mechanical		
• electrical		
28. Assist the client in filing documents for approvals and permits.		
29. Obtain the client's written authorization to proceed to bidding or negotiation phase.		

V Bidding and Negotiation Phase

Part A — *Tasks during the bidding and negotiation phase*

1. For open bidding:		
Assist the client in publishing the advertisement for bids. If separate contracts are to be awarded, separate advertisements may be necessary.		
Obtain qualification statements from interested bidders and review.		
2. For invited bidding:		
Notify selected bidders.		
3. For direct selection:		
Assist the client in selection as requested.		
4. Determine number of sets of bid documents required and order same.		
Review client-architect agreement for agreed-upon number of sets (if applicable).		
5. Distribute documents to bidders and obtain deposits.		
6. Issue documents to local construction association for viewing.		
7. Hold pre-bid meeting and site tour as required.		
8. Record all bid document inquiries.		
9. Prepare and issue addenda as necessary. Ensure that the bidders have a reasonable amount of time to review prior to bid closing.		
10. Return deposit to bidders who withdraw upon satisfactory return of bid documents.		
11. Return deposit to disqualified bidders upon satisfactory return of bid documents.		
12. Receive, open, tabulate, and analyze bids as per procedure established with the client. Obtain assistance of consultants as required.		
13. Advise the client on selection of alternatives, separate prices.		
Review bids and analysis with the client.		
Obtain the client's instructions.		
14. Notify successful bidder of acceptance and basis of acceptance.		
15. Update project directory.		
16. Assist the client in issuing letter of intent if contract cannot be executed immediately.		
17. Notify unsuccessful bidders and obtain return of bid documents.		
18. Return unsuccessful bidders' deposit upon satisfactory return of bid documents. (Retain bid deposit of lowest bidders until contract signing.)		
19. Request and receive submission of post-bid information:		
• performance bond		
• labour and material payment bond		
• insurance certificates		
• workers compensation		
• other		
20. Prepare or assist the client's legal counsel in preparation of construction contract. If separate contracts are awarded, obtain assistance of consultants as required.		
21. Assist the client and contractor in execution of the construction contract.		

VI Contract Administration Phase

Part A — *Tasks to be completed prior to start of construction and after execution of contract(s)*

1. Hold pre-construction meeting with client and contractor to clarify special requirements and contract administration procedures		
2. Request, from the contractor, all bonds and insurance policies required in contract documents.		
Forward documents to the client for analysis and acceptance by experts.		
Advise the client to obtain legal confirmation.		
3. Advise the client to file copies of property insurance policies with the contractor, where applicable.		
4. Request the client to purchase special insurance (hazard, etc.) as part of property insurance policy, as appropriate.		
5. Remind the contractor to secure and pay for all required permits as specified in contract documents.		
6. Obtain and review the contractor's construction schedule.		
7. Obtain and review the contractor's schedule of required shop drawings and samples.		
8. Obtain and review the contractor's schedule of values.		
9. Furnish the contractor with required copies of contract documents.		
10. Assist the client, or direct the consultants to assist with applications for gas, water, electricity, telephone, and other services, as required.		

Part B — *Tasks during the contract administration phase*

1. Establish, with the contractor, requirements for testing and inspection of specific materials and work by inspection and testing companies.		
Arrange for distribution of reports through proper channels for action if necessary.		
2. Prepare colour and finish selections. (Note: this is sometimes done in Construction Documents phase.)		
Obtain the client's approval.		
Issue to the contractor.		
3. Review submitted shop drawings.		
Instruct the consultants to review as appropriate.		
4. Review submitted samples where applicable and comment accordingly.		
Instruct the consultants to review as appropriate.		
5. Maintain shop drawing and sample record (refer to Form 5.4, Log of Shop Drawings and Samples, in Chapter 2.4).		
6. Advise on interpretation of contract documents.		
Issue supplemental details and instructions as required (refer to Form 3.2, Supplemental Instructions, in Chapter 2.4).		
7. Attend site meetings.		
8. Make site visits to observe specific events as required.		
Submit — to the client, to the contractor, and to Authorities Having Jurisdiction — all field review reports, including those of professional engineering consultants (refer to Form 3.1, Field Review Report, in Chapter 2.4).		
Issue written instructions to the contractor when applicable.		
9. Advise on interpretation of contract documents and on contemplated changes.		
Process and coordinate changes to contract after consultation with the client.		
Review contractor's submissions for changes in contract sum and time in conjunction with professional engineering consultants.		
Advise the client on validity of claims for extras.		
Issue Change Orders as required.		
Obtain the client's signature/approval.		
Copy appropriate authorities as applicable.		

Part C — *Ongoing scheduled tasks during the contract administration phase*

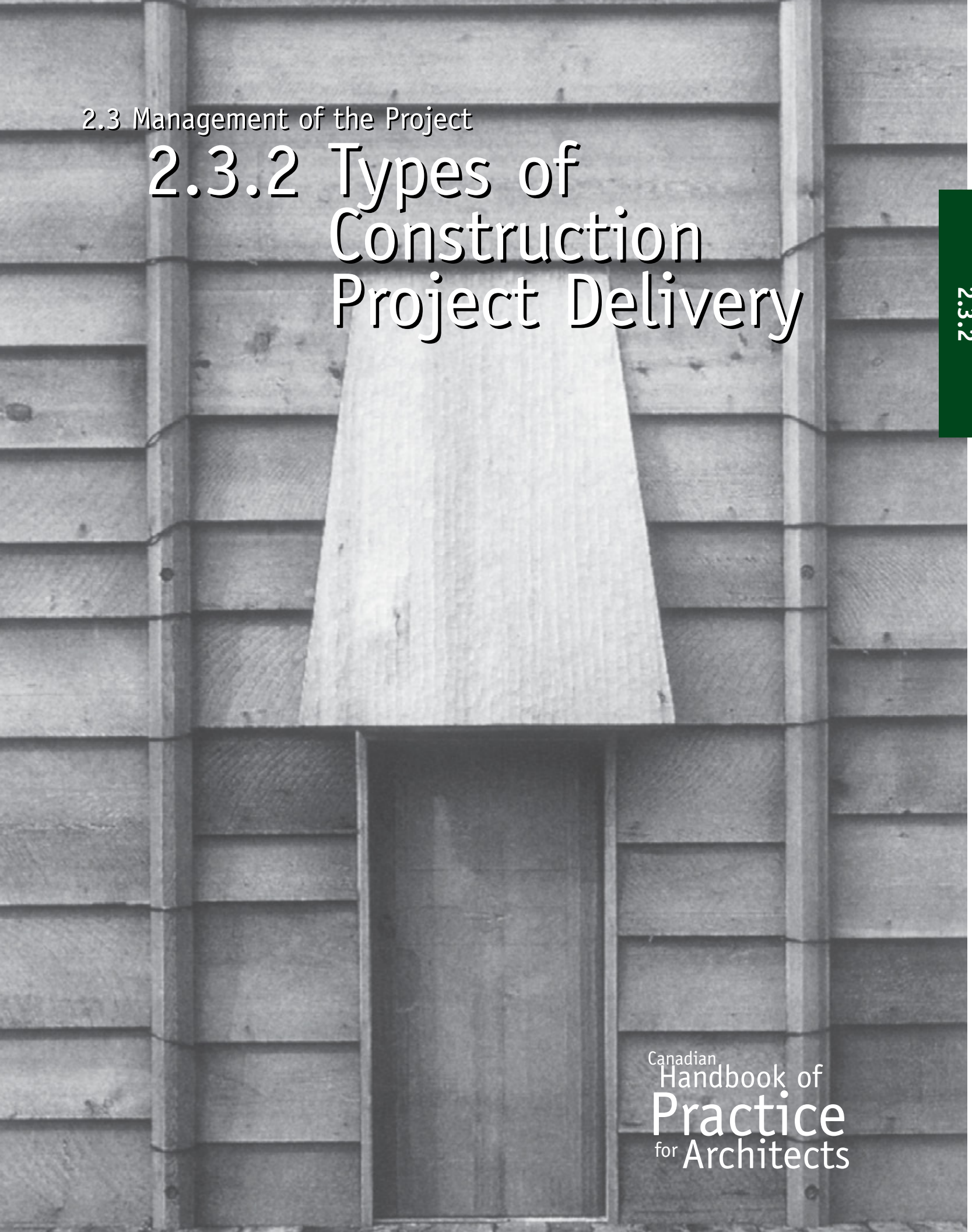
1. Make periodic visits to site to determine whether construction is in general conformity with contract documents.		
2. Coordinate general reviews and other services of professional engineers and direct findings through proper channels for action or review.		
3. Obtain and review the contractor's updated progress schedule and advise the client of potential revisions to date of substantial performance (if required).		
4. Evaluate work performed and materials supplied in relation to the contractor's progress application.		
Issue appropriate Certificate for Payment covering the contractor's request.		

Part D — *Project take-over tasks*

1. Review prescribed procedures, e.g., specifications and other documentation.		
2. Arrange for appropriate personnel to attend demonstration(s) of systems, including take-over of applicable operating systems and instructions.		
Obtain appropriate record.		
3. Receive, from the contractor, application for Certificate of Substantial Performance and list of items to be completed or corrected.		
4. Carry out site visit for substantial performance.		
5. Review findings in relation to contract and provincial lien legislation.		
Certify substantial performance or notify the contractor if substantial performance not certified, and provide reasons.		
6. Obtain and review required documents for release of holdback monies.		
Issue Certificate for Payment for release of holdback.		
7. Assist the client in obtaining occupancy permit if required or requested.		
8. Obtain from the contractor:		
• warranties		
• certificates of inspection		
• equipment manuals		
• workers compensation certificate		
• operating instructions		
• statutory declaration documents		
• keying schedules		
• maintenance stock		
• Record drawings		
• other specified items		
9. Receive, from the contractor, application for statement of completion.		
10. Carry out site visit for completion.		
11. Review findings in relation to contract and provincial lien legislation.		
Issue:		
• statement of completion or notify contractor if project not found to be complete		
• reasons		
12. Issue Certificate for Payment of holdback for work based on the contractor's application for statement of completion.		
13. Receive the contractor's written notice that all work has been totally completed.		
14. Perform final visit to site.		
Issue site visit report.		
15. Receive, from the contractor, final application for payment.		
16. Issue final Certificate for Payment.		
17. Prepare CAD record drawings if required.		
18. Submit final invoices to the client.		
19. Advise professional liability insurer of project completion date, as required.		
20. Review reported defects during one-year warranty period.		
Notify the contractor of items requiring correction.		
21. Carry out review of reported defects or deficiencies prior to expiry of one-year warranty period.		
Notify the contractor of items requiring correction.		

VII Post-construction Services

1. Assist the client in administering corrective action by the contractor where defects or deficiencies occur within extended warranty period.		
2. Prepare Project Data Sheets for marketing purposes (include photographs, client testimonials, etc.).		



2.3.2 Types of Construction Project Delivery

Canadian Handbook of Practice for Architects

2.3.2

Introduction

Types of Construction Project Delivery
- Stipulated Price Contract (Design-Bid-Build)
- Construction Management
- Design-Build
- Public Private Partnership
- Others

Contractors
- Pre-qualification of Contractors
- Multiple Contracts

Types of Construction Contracts
- Standard Forms of Contract
- Other Types of Contracts

Definitions

References

Appendix — Project Management
1. Scheduling the Project
   - Milestone Chart
   - Gantt Diagram
   - Program Evaluation and Review Technique (PERT)
   - Critical Path Method (CPM)
2. Preparing a Critical Path Method (CPM) Schedule

Chart: Standard Forms of Construction Contract and their Application

Types of Construction Project Delivery

Introduction

The design and construction industry is changing at a rapid pace. Options for project delivery have multiplied and more than one option is available for each project, depending on the client's needs and the project team's ability to deliver. *Project delivery* methods in the construction industry have evolved in response to:

- increased owner requirements;
- more urgent time frames;
- increased demands for quality and safety;
- the need to reduce adversarial relationships in construction;
- economic pressures.

Project delivery is a general term describing the comprehensive process used to successfully complete the design and construction of buildings and other facilities. The term is used to include all the procedures, actions, sequences of events, obligations, interrelations, contractual relations, and various forms of agreement.

There is no "best" delivery system; each is appropriate in particular circumstances.

Types of Construction Project Delivery

This section provides:

- a brief description of common delivery methods;
- a basis for comparing them;
- a general evaluation of their advantages and disadvantages.

Stipulated Price Contract (Design-Bid-Build)

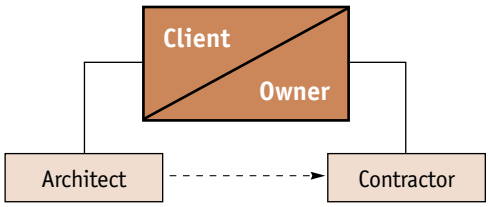
Most building projects follow this traditional method of project delivery (sometimes referred to as "Design-Bid-Build") in which:

- the owner engages an architect to prepare the design, drawings, and specifications;
- the owner hires a contractor by competitive bidding to build the facility under a construction contract (usually CCDC 2, *Stipulated Price Contract*);
- the architect administers the contract, and reviews and certifies the construction.

This *design-bid-build* form of project delivery is characterized by:

- its three distinct phases;
- its two independent contracts between: the architect and the client/owner; the contractor and the client/owner;
- the linear sequencing of the process.

Illustration 1: Design-Bid-Build



Key to the Diagram
——— contract between two parties
- - - - - monitor/review/administer

Advantages
- widespread use and familiarity;
- clear roles assigned to each party;
- generally a transparent process
- thorough resolution of the program requirements and design prior to construction;
- Direct professional relationship between the client / building users and the architect;
- has a known price before construction begins.

Disadvantages
- separation of design and construction restricts useful communication;
- clients sometimes perceive "extras" to be more prevalent and costly in this form of

The following table provides a brief Executive Summary of the some common Types of Construction Project Delivery:

Method of Construction Project Delivery	Standard Form of Contract	Description
Design-Bid-Build	RAIC Document Six: Canadian Standard Form of Contract for Architectural Services *followed by* CCDC 2 Stipulated Price Contract (CCDC 3 or CCDC 4 may also be used)	Owner engages the architect to provide design services and prepare construction documents which are issued for competitive bids. General contractors submit bids for the project and the construction contract is awarded to the lowest bidder. The architect administers the construction contract.
Construction Management	CCDC 5a - Construction Management Contract for Services CCDC 5b - Construction Management Contract for Services and Work	Owner engages the architect to provide design services and prepare construction documents. The Construction Manager works for the Owner as a consultant providing services that normally include design input on constructability, cost estimating, scheduling, bidding, coordination of contract negotiations and award, timing and purchase of critical materials, cost control and coordination of construction activities
Design-Build	CCDC 14 Design-Build Stipulated Price Contract CCDC 15 Design-Builder / Consultant Contract (subcontract)	A method of project delivery in which the Owner contracts directly with a single entity that is responsible for both design and construction services for a construction project
Public Private Partnership (P3)	No standard form of contract	A form of partnership between the public and private sectors where a combination of financing, design, construction, operation and maintenance of public projects relies on alternate sources of financing and revenue to cover all or part of the capital costs (including debt servicing, principal payment and return on equity), as well as operating and maintenance costs of for the project.
Single Purpose Entity for Integrated Project Delivery	Not yet available in Canada, as of January 2009 In the US, AIA Document C195	This new form of project delivery, championed by the AIA, creates a new single purpose entity or limited liability company which includes members such as the owner, architect, construction manager and other key project participants in the design and construction the project. The entity enters into contracts with non-members for design, trade contractors and suppliers for services, labour and materials. The entity enters into a separate agreement with the Owner to obtain project funding.

project delivery than others (although every form of project delivery carries a construction contingency);
- the contractor is unknown when the construction documents are prepared.
- contracts, particularly for public sector projects, are awarded to the low bidder who may not be well-qualified to do the work. Prequalification of contractors on public sector bids is not common.

Construction Management

Construction management is a broad term covering a variety of project delivery scenarios in which a construction manager (CM) is added to the building team at an early stage to oversee such elements as schedule, cost, construction method, or building technology. A construction manager may be:

- an architect;
- a contractor;
- an engineer or developer;
- an individual or team with specialized training in construction management.

Because this method adds a consultant and the associated fee, it is more commonly used on large, complex projects than those that are relatively small and simple. However, occasionally an architect acts as the construction manager on small projects such as house additions and renovations. Construction management is not a licensed activity in most provinces.

CMs can serve in different capacities with varying degrees of authority and responsibility (advisor, agent or constructor). Depending upon how the project is organized, a CM can:

- act as an **advisor** during a particular phase of the design, documentation or construction process;
- **manage** the construction of the project, with the owner contracting directly with each trade contractor. In this case, the CM may, or may not, be permitted to assume responsibility for construction activities typically outlined in General Conditions of the specifications (for example, temporary facilities, site layout, clean-up).

Savings in project costs are usually achieved only by the use of a delivery system that returns savings on sub-contractor bids directly to the owner with an "open book" accounting system and full transparency of all bids.

The fee paid to the construction manager is relative to the services to be performed. Refer to *CCDC 5a, Construction Management Contract for Services* and *CCDC 5b, Construction Management Contract for Services and Work* and their guides.

Typical responsibilities of a CM include:

- assisting in preliminary planning relative to the design requirements for the project;
- advising on schedules, budgets, and costs of various alternative methods, on material selection and availability, and on detailing during the design phase;
- advising on and arranging for all services and all trade contractors and suppliers to carry out the various phases of the work;
- planning, scheduling, coordinating, and supervising the activities of all trade contractors;
- providing technical and clerical services in the administration of the project.

Advantages
- direct contractual relationship with the owner;
- construction advice during the design process;
- the opportunity to call bids sequentially, thus saving time by permitting a start on construction before all documentation has been completed ("fast track");
- careful monitoring of costs and schedule (different checks and balances apply during design and construction because the architect, trade contractors, and CM are independent entities).

Disadvantages
- construction usually commences before the total costs are known;
- added costs and time in selection of an additional consultant;
- more complex relationships therefore traditional roles may be confused,
- the professional relationship between architect and owner and architect and contractor now includes a third party, sometimes complicating direct communication;

- potential for less control over final cost in an unstable construction market;
- Change Orders and delay claims are possible from prime or trade contractors who bid too low;
- there may be conflicts of interest if there is no independent cost consultant and the CM will be undertaking some of the construction work;
- the owner, as the "constructor," may not want to accept responsibility for construction safety;
- multiple construction contracts increase administrative costs for the Owner and the potential for coordination problems.

Design-Build

In Design-Build, the owner contracts with one firm to provide both design and construction. In fact, there are two variations on Design-Build: in some cases the Owner will initially engage an "advocate" architect (sometimes called a "bridging" consultant or Owner's Advisor) to prepare the Owner's Statement of Requirements and provide advice, and then engage a Design-Builder. In other instances, only a Design-Builder is hired.

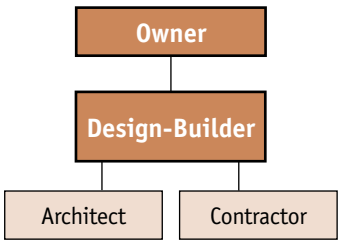
A Design-Build project usually has two phases:

- *Phase 1:* The Design-Builder, possibly in competition with other Design-Builders, provides architectural design services and, throughout the design process, monitors costs to ensure the building remains within the owner's budget. Based on the design developed in the first phase, the Design-Builder usually proposes a stipulated maximum price, which includes a fee for managing the construction.

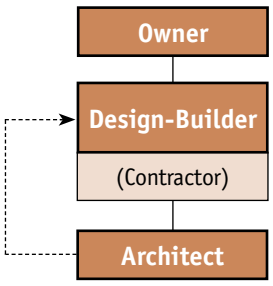
Illustration 2: A Comparison of Design-Bid-Build vs. Design-Build

Design-Bid-Build	Design-Build
Two contracts with the owner (more if engineers hired directly by the owner).	One contract with the owner (one point of primary responsibility).
Architect has contract with the owner.	Architect has contract with the Design-Builder (or is the Design-Builder).
Architect is usually engaged, and design and drawings complete, before the contractor is known.	Contractor is engaged before the design is complete.
Design and construction process is usually linear.	Design and construction process is more suitable for "fast track."
Familiar relationships: insurable, bondable, and acceptable under professional regulations.	Emerging relationships: terms of reference need to be checked for insurability, bondability, and acceptability under professional regulations.

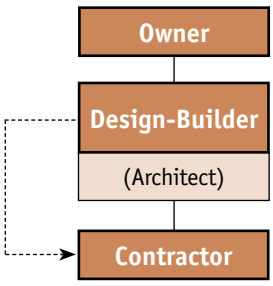
Design-Build (generic)



Design-Build (contractor-led)



Design-Build (architect-led)



Key to the Diagram

—— contract between two parties

- - - - - monitor/review/administer

- *Phase 2:* The parties enter into a stipulated price contract for the completion of the building. It is also possible to have a cost plus fee agreement in the Design-Build method of project delivery. The builder works to save costs during construction. Any savings accrue to the owner, who pays only the actual cost of construction, plus the Design-Builder's fee.

Refer to CCDC 14, *Design-Build Stipulated Price Contract*.

The following chart is a simplified comparison of Design-Bid-Build vs. Design-Build.

Advantages

- functional program (statement of owner's requirements) and owner's decisions are committed early;
- cost benefit analysis is addressed early in the design process;
- immediate feedback is received from the contractor on design options;
- streamlined process can increase efficiency;
- team approach is reinforced.

Disadvantages

- the responsibility for design approvals shifts from the owner to the Design-Builder;
- decisions by the Design-Builder are based more on initial cost rather than on design or long-term value;
- the cost is determined before the design is complete;
- additional fees when two architects are involved - an advocate architect engaged by the owner and a second architect engaged by the Design-Builder;
- architect's role as leader of the design team is reduced;
- high risk to the architect for preparing the proposal, which may or may not be successful;
- potential for tension between the "regulated" professional (architect) and the "unregulated" building contractor;
- potential for a lack of communication between the architect and the owner or building users;
- potential conflicts of interest in preparing Change Orders and certification because the architect's client and builder are one and the same.

Refer also to the *Design-Build Practice Manual* published by the Canadian Design-Build Institute.

Public Private Partnership

Public Private Partnerships or P3s (called "Alternate Financing and Procurement" or AFP in Ontario) is a relatively recent method of project delivery for public projects. It is generally used for infrastructure (civil engineering works) and larger scale public buildings, however, some governments are "bundling" several small buildings of the same type into one contract. P3s occur when the private sector works with governments or other public agencies to bring private sector capital and/or expertise to provide and deliver public services. The scale of a P3 project usually is significant and may include financing, design, construction, and very often facilities management and operations.

Critics of the process argue that the cost of P3 projects exceeds the cost of the same projects delivered under more traditional forms of project delivery because of the costs for financing and the hidden costs of "risk transfer" to the private sector. Governments and public agencies argue that these projects would not have been possible under traditional government processes using public funds. Furthermore, they argue that these projects can be delivered more quickly through P3s in response to the growing "infrastructure deficit".

This form of project delivery is used as a procurement method for larger infrastructure projects in government sectors in parts of Europe and Australia. For example, PFI or Private Finance Initiative is the standard method of project delivery in England.

Advantages

- uses the efficiencies and expertise of the private sector for public sector projects;
- allows projects to be financed in ways which may not be possible through public methods (such debentures, taxation, etc.) and may not be accounted for as a capital expenditure;
- life cycle costs can be reduced because with private sector operating the facility these costs become critical;

- single point responsibility;
- architects may develop long term relationships with ongoing consortia (project entities);
- reduced time and construction schedule to deliver projects compared with traditional public sector methods;
- design often becomes the "differentiating" quality in a proposal.

Disadvantages

- transfers or allocates certain financial risks to the private sector;
- "best value" is not always achieved as initial capital costs sometimes become overly important;
- potential for a lack of communication between the architect and the owner or building users;
- building users have less control over the process and its outcomes;
- sometimes more difficult to obtain professional liability insurance;
- difficult for small architectural practices to compete in this market.

Others

Other management and project delivery include:

- project management
- just-in-time;
- turnkey development;
- lease-back;
- cost plus

Project Management

The main difference between PROJECT MANAGEMENT and CONSTRUCTION MANAGEMENT is that the Project Manager has a contract with a client and in turn employs the architectural and engineering consultants to form his group, whereas under the Construction Management aspect the owner engages the architectural and engineering consultants, and at the same time or shortly afterwards, engages the services of a Construction Manager.
(Canadian Construction Association, *A Guide to Construction Management Contracts*)

In this delivery method, the Project Manager (PM) is usually hired by an owner during the pre-design phase to **manage the entire project** and engage all the disciplines required, including the architect and the consulting engineers. The typical project management project may have the same three phases (Design-Bid-Build) as traditional project delivery, or it may use sequential tendering to achieve earlier completion.

Advantages

- a well-informed owner is better able to make decisions on cost-versus-quality issues;
- the quality of the design may improve when the architect can draw on the PM's experience.

Disadvantages

- this arrangement is NOT permitted by the regulations of *most* provincial associations of architects. For example, in Ontario, unless the Project Manager is a "Design-Builder," this is contrary to OAA Regulation 42(55) as well as the Code of Ethics of OAQ and the *Architects Act* of British Columbia;
- unless the architect can maintain a direct link with the owner, the owner's ability to control construction quality is reduced because efficiencies or cost reductions implemented by the PM that affect quality may not be discussed directly with the owner.

Just-in-Time

This approach combines aspects of fast tracking, partnering, systems architecture, and strong incentives for repeat work. Large projects are broken into small work packages. Small teams of architects and contractors program, plan, demolish, and construct these areas on an hourly basis driven primarily by schedule, where time is the most critical factor.

Turnkey Development

Turnkey is generally described as a project delivery method that includes various real estate functions as well as design and construction. These functions may include site acquisition, entitlements, construction and/or long-term financing or other functions. This method may be carried out under Design-Build or developer proposal methods.

Unit Rates

Use of this method is limited primarily to heavy civil engineering work — such as roads, and site

preparation — where the contractor is paid for measured quantities at quoted unit rates. The method could be appropriate for the cost of repetitive units or identical buildings. The architect should ensure that unit rates are applied only to the design and documentation phases. The bidding and contract negotiations phase, as well as the contract administration phase, require full services.

Lease-back

Under this method, the project is financed, constructed, and owned by the builder, and the building is "leased-back" to the owner.

Cost Plus

In the cost plus method, the contractor is compensated for the actual costs of the work, plus a fee. The fee is based on:

- an agreed-upon fixed sum; or
- a percentage of the cost of the work.

Often called "time and materials," this method is appropriate for small, complicated projects in which time is a factor or total costs are initially difficult to determine. A variation of cost plus is "cost plus to a maximum upset price" or guaranteed upset price. The cost plus method normally uses CCDC 3, *Cost Plus Contract*, but is now frequently replaced by the construction management delivery method, which includes many of the advantages and few of the disadvantages.

Advantages

- costs are based on actual quantities and mark-ups with no "unknown factor";
- suitable when time frame is more important than construction costs (saves time because a formal tender call is not required);
- flexible in response to unknowns at the start of construction;
- suitable where extraordinary quality is required;
- construction may begin before design is complete.

Disadvantages

- no incentive to avoid cost overruns;
- often not permitted on publicly funded projects;
- total cost is unknown until project completion.

Contractors

Each type of project delivery has variations, which can be organized to suit the requirements of the project and the involvement of the contractor. Selecting the contractor best suited to the particular type of project delivery is an important decision.

Pre-qualification of Contractors

The purpose of pre-qualification is to ensure that the selected contractor is capable of delivering quality and value specific to the project requirements. The client, through pre-determined criteria, eliminates candidates who cannot demonstrate that they have the necessary financial capacity, technical expertise, managerial ability, and relevant experience for the project at hand. Pre-qualification is rarely used for public projects, where the opportunity to be considered as the contractor must be open to all. Refer also to Chapter 2.3.9, *Construction Procurement*.

CCDC 11, *Contractor's Qualification Statement*, is the standard document used for pre-qualification.

Multiple Contracts

There may be a variety of reasons to have multiple contracts for one project, such as:

- two or more general contractors are working on the same site;
- there is a need for sequential tendering for different parts of the project;
- the owner may be undertaking some of the work with his/her own forces, concurrent with a general contractor.

Some provinces have legislation which defines the owner as the constructor when there are multiple contracts. This has the effect of making the owner responsible for safety at the construction site.

Sequential tendering is sometimes required for different parts or phases of a project; in this instance, separate bid packages are issued for these parts, usually in the same sequence as required for construction (such as site work, foundations, structural shell, etc.).

Types of Construction Contracts

Standard Forms of Contract

The construction industry has recognized the advantages of jointly preparing standard forms of contract. Many of the documents are developed and endorsed by the Canadian Construction Documents Committee (CCDC). Refer to Chapter 1.2.1, *The Construction Industry*, for the composition and role of this committee.
The CCDC publishes Standard Contract Forms, including:

- CCDC 2, *Stipulated Price Contract*;
- CCDC 3, *Cost Plus Contract*;
- CCDC 4, *Unit Price Contract*.
- CCDC 14 *Design-Build Stipulated Price Contract*.

The forms, which are available in both English and French, are sub-divided into three parts:

- Agreement between Owner and Contractor;
- Definitions;
- General Conditions.

The use of CCDC Standard Contract Forms is recommended. Because each document is reviewed periodically by the CCDC and revised as required, the architect should obtain and complete the latest edition when preparing construction contracts for the client's use and execution.

Refer to "List: Canadian Construction Documents" at the end of Chapter 1.2.1, *The Construction Industry*.

Stipulated Price Contract
[CCDC 2, *Stipulated Price Contract* and CCDC 20, *A Guide to the Use of CCDC 2*]
This is the most common type of fixed-price contract. The stipulated price is established through bidding — either open bidding or invitation of bids from pre-qualified bidders. The successful contractor is paid a fixed price for the completed construction. The fixed price or time for construction can only be adjusted by Change Orders.

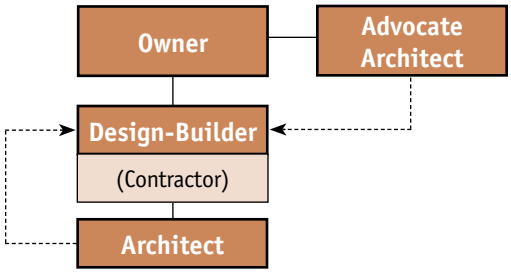
The contractor is required to perform work called for in the contract, regardless of what it actually costs. Thus, the contractor must take great care when pricing such work, taking into account potential cost increases caused by inflation, material shortages, or difficulties in meeting performance requirements.

A stipulated price contract can produce maximum profit for the contractor, who also assumes maximum risk, including the risk of unexpected additional costs such as those that might result from inflation or material shortages. This type of contract should be used when the construction costs are reasonably predictable and when full documentation is available.

Design-Build Stipulated Price Contract
[CCDC 14, *Design-Build Stipulated Price Contract*]
In the Design-Build stipulated price contract, the owner deals with one single business entity, which arranges to provide both design services and construction of the project under one contract package. Prices established before design is completed may cause disagreement over the scope of the work or the details of construction intended for inclusion in the stipulated price.

The prime contract is between the owner and the Design-Builder, where the Design-Builder could be a contractor, an architect, a broker, or a joint venture between a contractor and an architect. The architect should contact the respective provincial association to verify regulations concerning the architect's role as a Design-Builder, and for joint venture restrictions. The Design-Builder's consultants are the only consultants recognized in the contract, although the owner may also appoint an advocate architect or other consultants to represent the owner's interests.

Illustration 3: Bridging



The second contract [CCDC 15, *Design-Builder / Consultant Contract*] is between the project's Design-Builder and the architect.

Cost Plus Contract (percentage or fixed fee)
[CCDC 3, *Cost Plus Contract* and CCDC 43, *A Guide to the Use of CCDC 3*]
In a cost plus contract, the contractor is compensated for the actual costs of the work, plus a fee based upon either an agreed-upon fixed sum or a percentage of the costs. Often called *time and materials*, this method is appropriate for small, complex projects in which total costs are initially difficult to determine.

A cost plus contract is one of the simplest types of cost-reimbursement contracts. It has the following features:

- the owner reimburses the contractor for the allowable costs incurred in the course of construction;
- costs are paid regardless of the progress of the work and no matter how far the task is from completion;
- work may cease when the construction costs equal the funds provided for under the contract.

Guaranteed Maximum Price Contract
[CCDC 3, *Cost Plus Contract* with Guaranteed Maximum Price Option]
In this type of contract, the contractor is compensated for the actual costs, plus a fee with an agreed-upon maximum price. This is sometimes called an *upset price* contract. The contractor bears all costs beyond the pre-determined maximum. If the actual costs are below the maximum, the contractor may share the savings with the owner, depending on the terms of the contract. The guaranteed maximum price can be adjusted only by Change Order.

Unit Price Contract
[CCDC 4, *Unit Price Contract*]
In a unit price contract, the contractor is paid a pre-determined price for each unit or quantity of work or material used in the project's construction. The unit price can be derived through bidding or negotiation. The actual quantities involved are generally verified by independent inspection, for example, by a clerk of the works or a quantity surveyor.

Unit prices form the basis for payment of the contract price. Quantities in the schedule of prices are estimated. The contract price is:

- the final sum of the product of each unit price stated in the schedule of prices;
  multiplied by
- the actual quantity of each item that is incorporated in or made necessary by the work;
  plus
- lump sums and allowances, if any, stated in the schedule of prices.

Currently, CCDC 4, *Unit Price Contract*, has limited use in Canada for building construction. It is used primarily for civil engineering work.

Other Types of Contracts

Other types of construction contracts include:

- government or "in-house" contracts;
- contracts with economic price adjustment;
- incentive-based contracts;
- standing offer contracts;
- purchase order contracts;
- oral contracts.

Government or "In-house" Contracts
Various federal, provincial, and municipal governments have their own forms of contract which include different General Conditions. These documents are printed forms, and normally are not amended.

In some instances, a public body or large corporation will choose to prepare its own forms of contract for construction. The architect required to administer these documents should review these contracts prior to providing a proposal for contract administration services. Refer to Chapter 2.1.9, *Risk Management and Professional Liability*, for the pitfalls in the use of non-standard contracts.

Contracts with Economic Price Adjustment
Some fixed-price contracts contain economic price adjustment clauses that protect the contractor and the client against wide fluctuations in labour or material costs when market conditions are unstable. These clauses may provide for adjustment of the contract price for increases or decreases from an agreed-upon level measured against the following:

- published or established prices of specific items;
- specified costs of labour and material actually experienced during performance;

- specified labour or material cost standards or indices, such as the consumer price indexes.

Incentive-based Contracts
(also known as incentive contracts, cost-plus-incentive-fee contracts, and cost-plus-award-fee contracts)

The contractor and the owner's contracting officer agree on:

- target cost;
- target profit;
- target fee;
- incentive formula for determining the final fee.

The formula provides for an adjustment in the fee, based on any difference between the target cost and the total allowable cost of performing the contract. The award amount paid varies according to the client's evaluation of the contractor's performance in such areas as:

- quality;
- completion time;
- ingenuity;
- cost-effective management.

Standing Offer Contracts
Government or institutional clients may retain one or more consulting firms, or construction companies pre-qualified by proposal call, to provide professional or construction services on an *as and when requested* basis (sometimes referred to as being "on retainer" or "on call"). Occasions arise when consulting or construction services are required to augment existing resources within a professional and technical services branch of government. Such a situation can encompass:

- peak workload relief;
- project review to ensure a higher degree of performance;
- situations where in-house expertise is not available.

Purchase Order Contract
Authorized officials (public or private) may purchase design and construction services not exceeding a stated amount using purchase orders. The use of purchase orders is usually restricted to:

- small transactions;
- one delivery and one payment;
- off-the-shelf items;
- small repairs.

Oral Contracts
Oral contracts should *never* be used. All agreements should be in writing.

Written client-architect agreements are a requirement of the Architectural Institute of British Columbia.

Definitions

Construction Manager: An individual employed to oversee and direct the construction elements of a project, usually the whole of the construction elements, and the parties who are to perform them; a company which contracts with an owner to perform such services for a fee.

Design-Build: Methods of project delivery in which one business entity or alliance (Design-Builder) forges a single contract with the owner, and undertakes to provide both the professional design services (architectural/engineering) and the construction.

Project Manager: The leader of the team of all necessary disciplines (design, construction, supply, etc.). The project manager provides all major essentials for the project. (The term "project manager" may be confused with construction manager; the meaning has become blurred and is currently often used merely for the individual within the conventional hierarchy.)

References

Associated General Contractors (AGC) of America. *Project Delivery Systems For Building Construction*. Alexandria, VA: AGC, 1997.

The American Institute of Architects (AIA). *Handbook on Project Delivery*. Sacramento, CA: The AIA California Council, 1996.

Canadian Construction Association (CCA). Ottawa, Ont.

- CCA 5, *Canadian Standard Construction Management Contract Form and A Guide to Construction Management Contracts*.
- CCA 17, *Stipulated Price Contract for Trade Contractors on Construction Management Contracts*.
- *A Guide to Construction Management Contracts*.
- *Performance Standards for Project Management and Scale of Fees for Project Management Services*.

Canadian Construction Association, Construction Specifications Canada, and the Royal Architectural Institute of Canada (endorsed by). Document 14, *Design-Build Stipulated Price Contract*. Ottawa, Ont.

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.

- CCDC 2, *Stipulated Price Contract*.
- CCDC 3, *Cost Plus Contract*.
- CCDC 4, *Unit Price Contract*.
- CCDC 11, *Contractor's Qualification Statement*.
- CCDC 14 *Design-Build Stipulated Price Contract*.
- CCDC 20, *A Guide to the Use of CCDC 2*.
- CCDC 43, *A Guide to the Use of CCDC 3*.

Canadian Design-Build Institute (CDBI). Ottawa, Ont.

- 100 Series: Introduction and General
- 200 Series: Procurement and Award
- Document 205: Methodology Assessment Matrix
- Document 210: Request for Proposal Guide
- 300 Series: Responding to RFQ's & RFP's
- Document 310: Conceptual Estimating
- 400 Series: A Guide to Project Delivery
- 500 Series: Model Forms

The Canadian Council for Public-Private Partnerships, *www.pppcouncil.ca*

Fisk, Edward R. *Construction Project Administration*. 5th Edition. Upper Saddle River, NY: Prentice Hall Press, 1997.

Gould, Frederick E. *Managing the Construction Process: Estimating, Scheduling, and Project Control*. New York, NY: Prentice Hall Press, 1997.

Kerzner, Harold. *Project Management: A Systems Approach to Planning, Scheduling, and Controlling, 6th Edition*. New York, NY: Van Nostrand Reinhold, 1997.

Lewis, James P. *The Project Manager's Desk Reference: A Comprehensive Guide to Project Planning, Scheduling, Evaluation, Control Systems*. Chicago, IL: Probus Pub. Co., 1993.

Litwin, Paul et al. *Access '97 Developer's Handbook — 3rd Edition*. Alameda, CA: Sybex, 1997.

Pierce, David R., Jr. *Project Scheduling and Management for Construction*. Second Edition. Kingston, MA: R.S. Means Co., Inc., 1998.

Appendix — Project Management

1. Scheduling the Project

Project schedules are planning tools that help project managers and teams organize various defined tasks in order to meet deadlines or dates which may be set out in an agreed-upon schedule or in the contract. In addition, schedules help to monitor tasks until the project is complete. Although a variety of scheduling techniques are available for many types of projects, the project manager must select a method which can be adapted to the scale and complexity of the work.

Milestone Chart

This simple method of scheduling involves setting target dates for each project activity. The name of the person responsible for each activity may also be noted. This method is used for:

- bidding;
- simple projects with a linear implementation;
- summaries of more complex scheduling arrangements.

This chart has limited potential because it can only indicate the end date — not the start date — of activities. Moreover, it does not show relationships between activities.

Diagram A: Milestones in the Bid Process

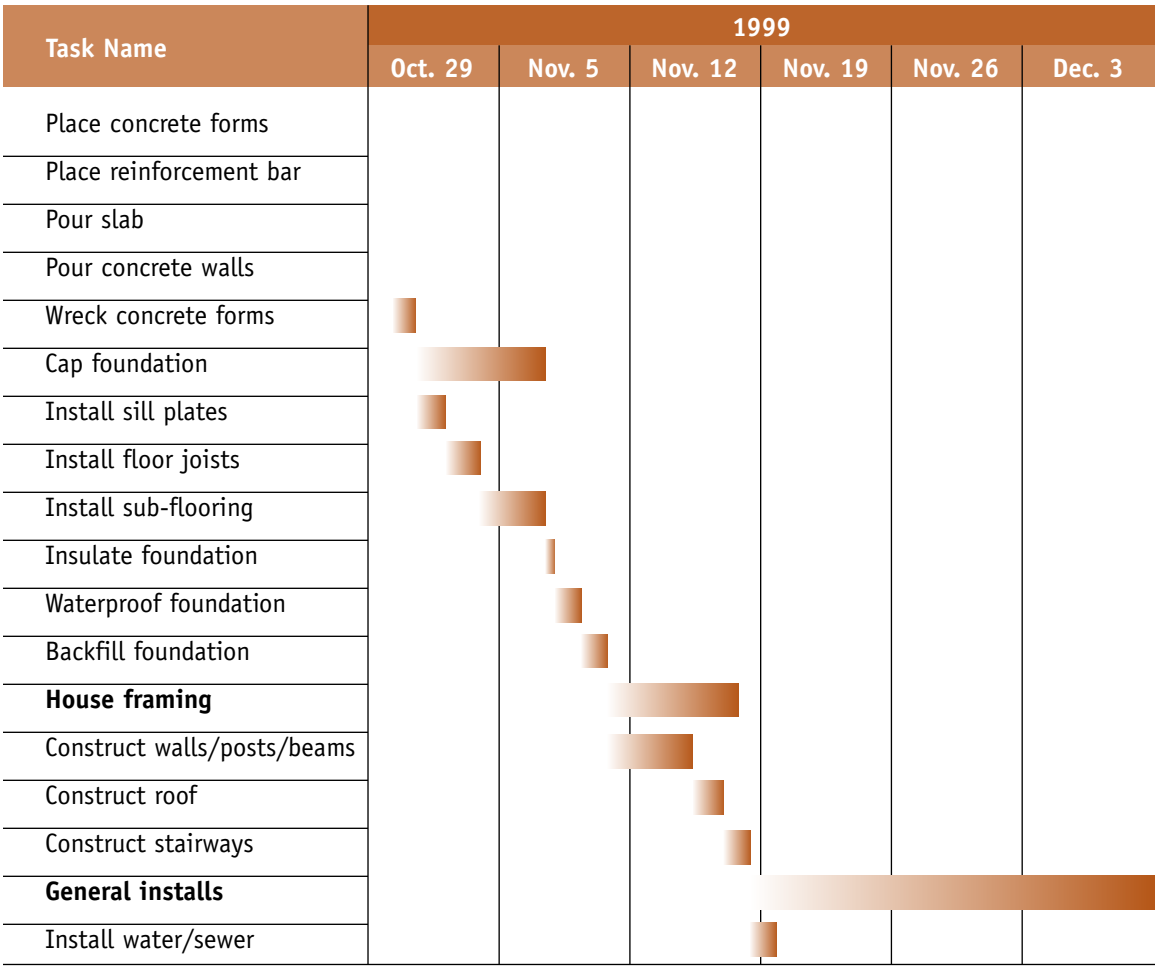
Task	Milestone Date
Issue text to newspapers	February 1, 2009
Distribute documents to bid depositories	February 4, 2009
Publish advertisements for bidders	February 5, 6, and 8, 2009
Issue final addenda	March 4, 2009
Bid closing	**March 11, 2009**
Analyze bids	March 12, 2009
Report to building committee	March 15, 2009
Notice of award of contract	March 17, 2009
Prepare and distribute CCDC 2 and contract documents	March 26, 2009
Start-up meeting	**April 19, 2009**

Gantt Diagram

Unlike a milestone chart, a Gantt diagram (a type of bar chart) lists all the required activities together with a horizontal line for each activity to indicate the beginning and end of each task in accordance with a time period shown at the top of the chart.

The bar chart is very common because it is easy to use, visually clear, and satisfies the requirements for most projects. On the other hand, it does not provide any information on the relative importance of tasks or their interrelationships.

Diagram B: Partial Gantt Chart or Bar Chart



Program Evaluation and Review Technique (PERT)

The Program Evaluation and Review Technique (PERT) is another method for monitoring the progress and periodically adjusting the schedule. PERT involves:

- defining the various tasks and milestones;
- linking these tasks in sequence;
- assigning a time estimate for the completion of each task.

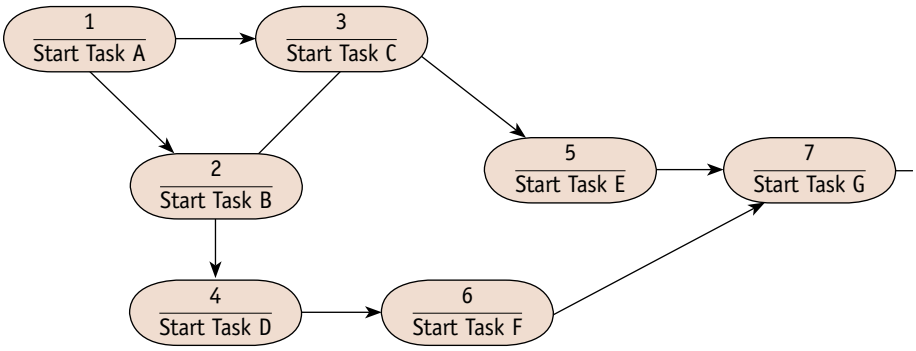
PERT is usually a graphical representation of the *dependency* network for an entire project. Dependencies are timing relationships between tasks which determine the *sequence of activities* or work flow in a project. Tasks are usually represented as boxes, and dependencies are represented as lines connecting the boxes.

PERT has one basic weakness: the fundamental assumptions of the length of time for completing each task are merely estimates and are not precise. Occasionally, formulae are used to increase the probable accuracy of the time estimate. For example, a better estimate of mean time can be achieved using the following formula:

$$T = \frac{a + 4m + b}{6}$$

T = mean time
a = most optimistic time, i.e., the shortest time for completion (best case scenario)
b = most pessimistic time, i.e., the longest time for completion (worst case scenario)
m = most likely time, i.e., the time that the work would most likely be completed based on its execution several times under randomly varying conditions

Diagram C: The PERT Network



T_e = earliest estimated completion time
T_1 = latest estimated completion time
S = slack time

Task A **Cure concrete**
T_e = 0 days
T_1 = 0 days
S = 0 days

Task B **Construct concrete block foundation wall**
T_e = 2 days
T_1 = 2 days
S = 0 days

Task C **Strip formwork**
T_e = 1 day
T_1 = 1 day
S = 0 days

Task D **Install anchors and sill plates**
T_e = 9 days
T_1 = 9 days
S = 0 days

Task E **Install filter fabric, gravel, and drainage tile**
T_e = 2 days
T_1 = 11 days
S = 9 days

Task F **Frame ground floor**
T_e = 11 days
T_1 = 11 days
S = 0 days

Task G **Backfill**
T_e = 13 days
T_1 = 13 days
S = 0 days

Critical Path Method (CPM)
This scheduling method uses arrows or lines to graphically demonstrate the relationships between:

- which activity must be undertaken first;
- which activity cannot be started until another has been completed;
- which activities can be carried out concurrently.

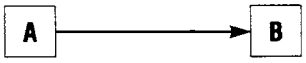
The chart helps to determine *the critical path* and identifies the stages which, if they are delayed, will slow down the entire project. It also identifies which activities can be delayed and for how long without having an impact on the duration of the project. Such delay capacity is called "float."

This type of project scheduling is frequently used for construction projects because many activities are underway at once, each dependent on the other.

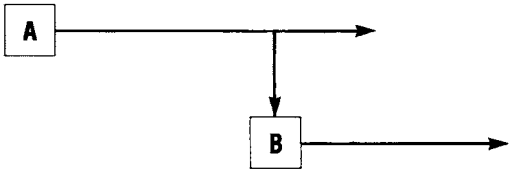
2. Preparing a Critical Path Method (CPM) Schedule

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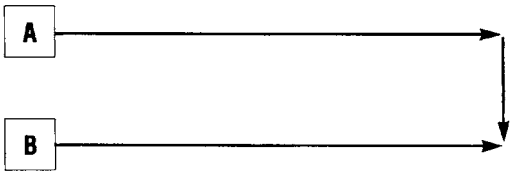
Step 1. Identify Task Interrelationships. The first step in preparing a CPM schedule is to identify systematically all task interrelationships. One way of doing this is to use a task interface diagram, also known as a precedence diagram. This diagram describes each of the three distinctive types of interrelationships graphically as follows:



Task A must be completed before task B can begin.



Task A must be partially completed before task B can begin.



Task A must be completed before task B can be completed.

An example of the first case would be:

Task A = determine heat loads
Task B = select air conditioning unit

Obviously the air conditioning unit cannot be selected until the heat loads are known.

An example of the second case would be:

Task A = prepare structural calculations
Task B = prepare structural drawings
Although structural calculations are necessary for the structural drawings, it is not necessary that the

calculations for *all* the structures be completed before the drawings of *some* of the structures can begin. Thus, task B cannot be started until a certain amount of progress has been made on task A.

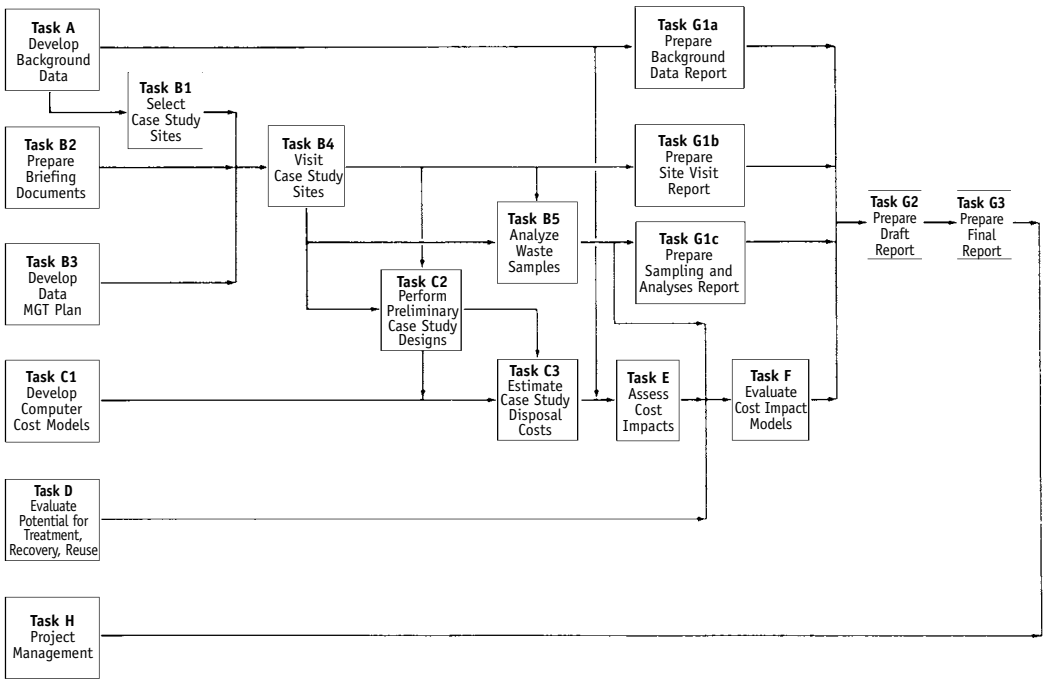
An example of the third case would be:

Task A = prepare piping drawings
Task B = prepare piping specifications

The specifications for common elements (including pipe supports, installation, and testing) can begin as soon as the project is reasonably well defined. However, the specifications cannot be completed until all the drawings are completed, so that all piping materials, valve types and so forth can be selected, identified, and tabulated.

Illustration A-1 shows how these interrelationships can be represented for a complete task outline. Study this diagram to see which of the three types of interrelationships exist between each pair of tasks. Note also that in this example, there is more than one type of interrelationship between two tasks. For example, interrelationship types 2 and 3 exist between tasks C2 and C3. In other words, task C3 (cost estimates) cannot begin until task C2 (preliminary design) is partially completed, and task C3 cannot be completed until task C2 has been completed. This double interface is quite common.

Illustration A-1: Task Interface Diagram



Step 2. Establish Optimum Task Durations. The next step is to establish the optimum duration for each activity on the task outline. This is the length of time (in calendar days) required for the activity to be completed in the most efficient manner possible assuming that all prerequisite tasks have been completed. A typical tabulation of task durations is presented in Illustration A-2 (using the same sample project as in the preceding illustration).

Note that task H, project management, is scheduled to extend 60 days beyond completion of all other tasks. This is typical of most projects performed by design firms. Even if all contractual responsibilities are completed by the contract due date, activities tend to continue beyond that date, such as printing of additional copies of drawings, answering questions from contractors or equipment vendors, organizing project files, or appearing at City Council meetings. Even if all contractual obligations have been met, these residual activities are part of the project management task and should be scheduled as such.

Step 3. Prepare Project Schedule. Having completed the basic task interface diagram and established optimum task durations, you may use these results to prepare a project schedule. Do this either in bar chart format or CPM format, in which the schedule is drawn as a network. The network schedule is best explained by using the same examples of simple two-task projects.

Let us say that the first sample project contains the following tasks and durations:

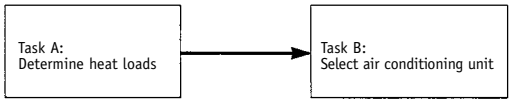
Task A = determine heat loads (five days' duration)
Task B = select air conditioning unit (four days' duration; cannot start until task A is completed)

Illustration A-2: Task Duration

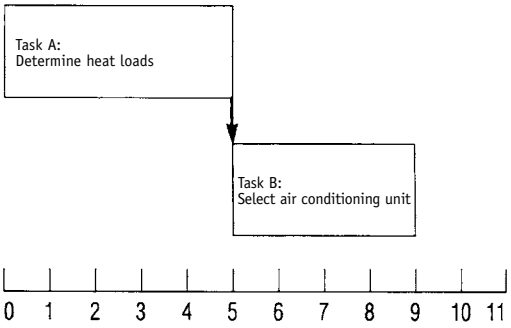
Activity Description	Calendar Days
A. Develop background data	180
B1. Select case study sites	30
B2. Prepare briefing documents	30
B3. Develop data management plan	90
B4. Visit case study sites	180
B5. Analyze waste samples	105
C1. Develop computer cost models	90
C2. Perform preliminary case study site designs	135
C3. Estimate case study disposal costs	30
D. Evaluate treatment, recovery, reuse	90
E. Assess cost impacts	60
F. Evaluate cost impact models	30
G1a. Prepare background data report	60
G1b. Prepare site visit report	60
G1c. Prepare sampling and analysis report	60
G2. Prepare draft report	60
G3. Prepare final report	60
H. Project management	*

* Task H should be completed 60 days after completion of all other activities.

The task interface diagram for this project will be:



This interface diagram can be converted to the network schedule shown below based on the defined task durations:

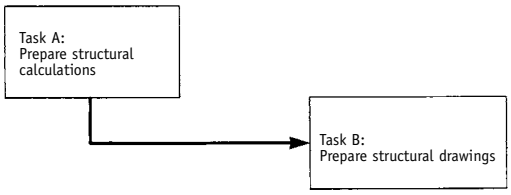


The vertical arrow in the network schedule serves the same purpose as the horizontal arrow in the interface diagram: to show that task B cannot begin until task A is completed. The arrow for the network schedule must be vertical to show that no time should elapse between completion of task A and start of task B. These vertical arrows are known as "dummy activities."

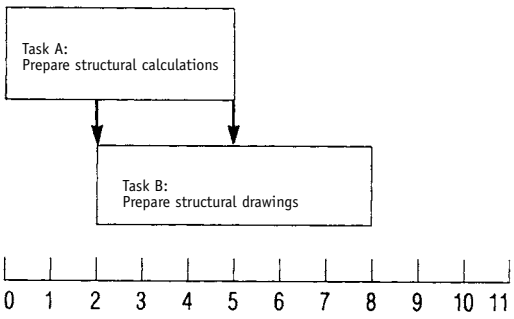
The second example contains the following tasks and durations:

Task A = prepare structural calculations (five days' duration)
Task B = prepare structural drawings (six days' duration; can begin after two days' work on task A)

The task interface diagram:



This diagram can be developed into the following network schedule:

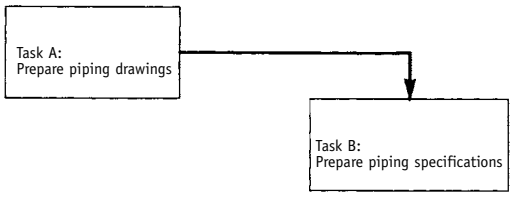


Note that the above schedule presumes that sufficient progress can be made by working on task A for two days in order to permit task B to be started. Again, the vertical arrow in the network schedule identifies the interrelationship between tasks A and B.

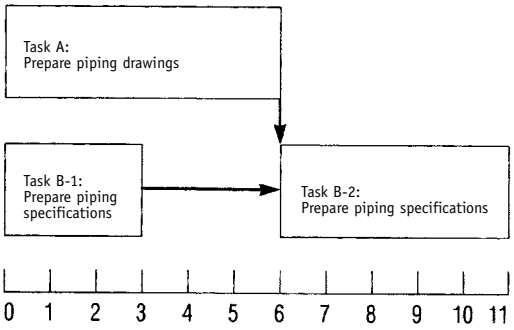
The third example defines the tasks and their durations as follows:

Task A = prepare piping drawings (six days' duration)
Task B = prepare piping specifications (eight days' duration; can start concurrently with task A, but three days' work remains after task A is completed)

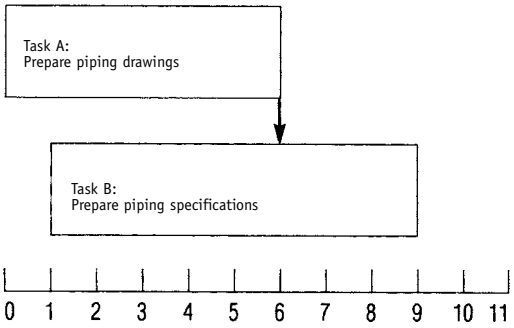
The task interface diagram:



From this interrelationship and durations of tasks, the following network diagram may be drawn:



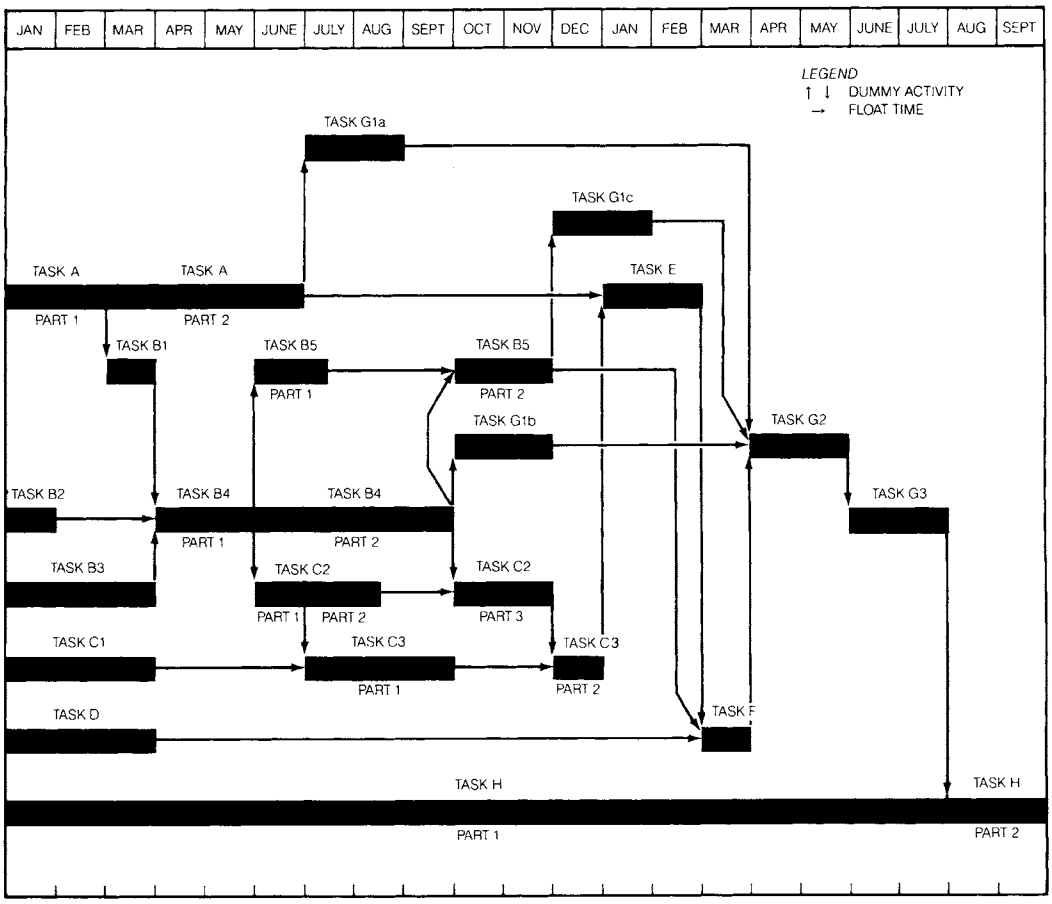
Note that task B can proceed up to a certain point, at which time you will need input from task A. If you had found that only three days of productive work could be done on task B prior to completion of task A, the schedule for the project above would have been:



Although the optimum duration of task B had been established as eight days, eleven days will actually be required to complete this activity. The additional three days are spent waiting for task A to be completed before the second part of task B can be started. This delay is shown by the horizontal arrow connecting parts one and two of task B. These horizontal arrows are referred to as float time.

The methods shown in the above examples may be used to develop a network schedule such as the one shown in Illustration A-3.

Illustration A-3: Time-Based Task Interface Diagram



Step 4. Determine Critical Paths. The last step in the CPM procedure is to determine which tasks are critical — that is, which tasks will affect the project completion date if any delay occurs. The critical tasks for each of the four two-task project examples are shown in Illustration A-4. For projects with fewer than 100 tasks, the critical tasks may be determined by graphic inspection, with results such as those in Illustration A-5.

Illustration A-4: Critical Tasks for Sample Projects

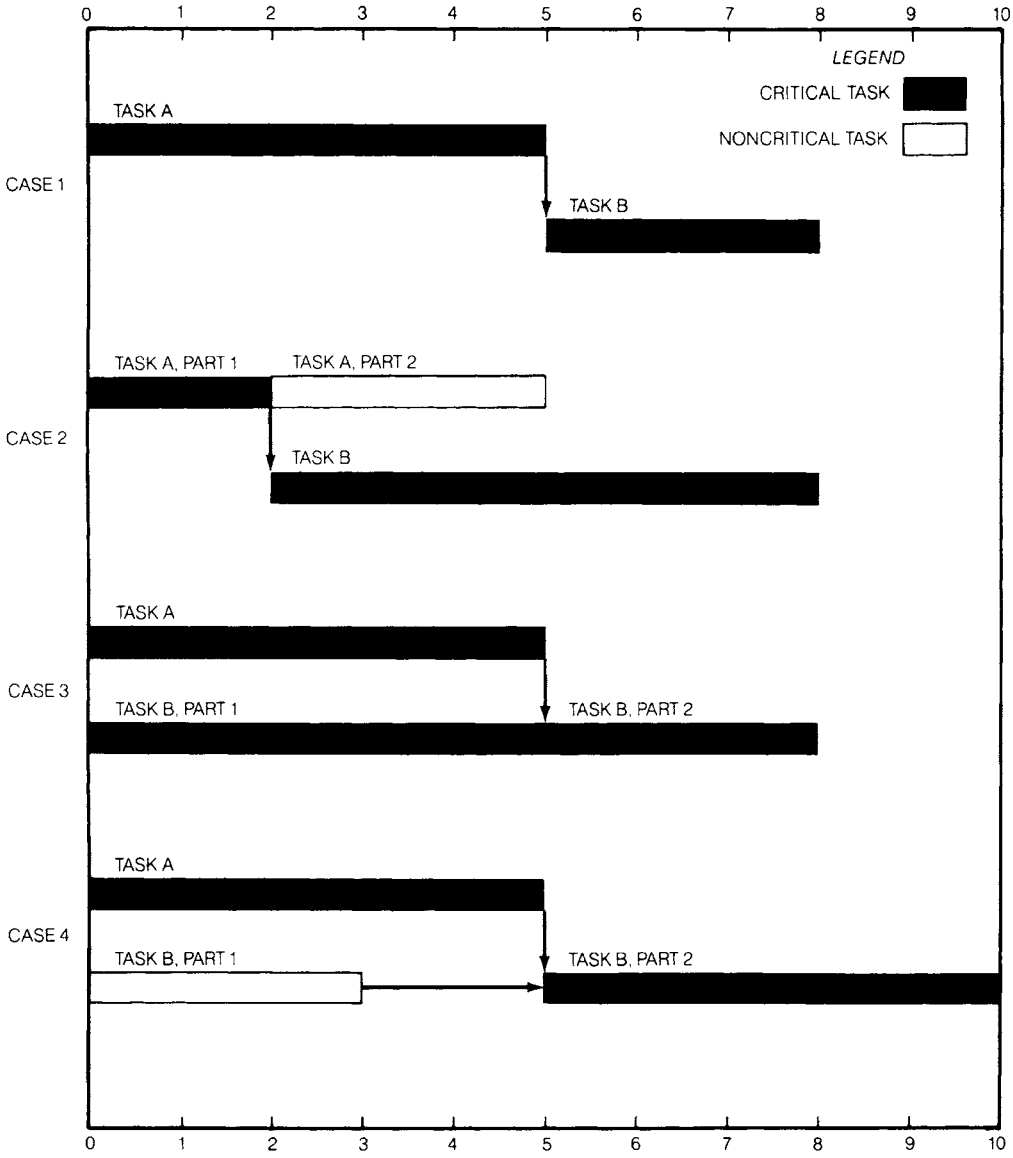
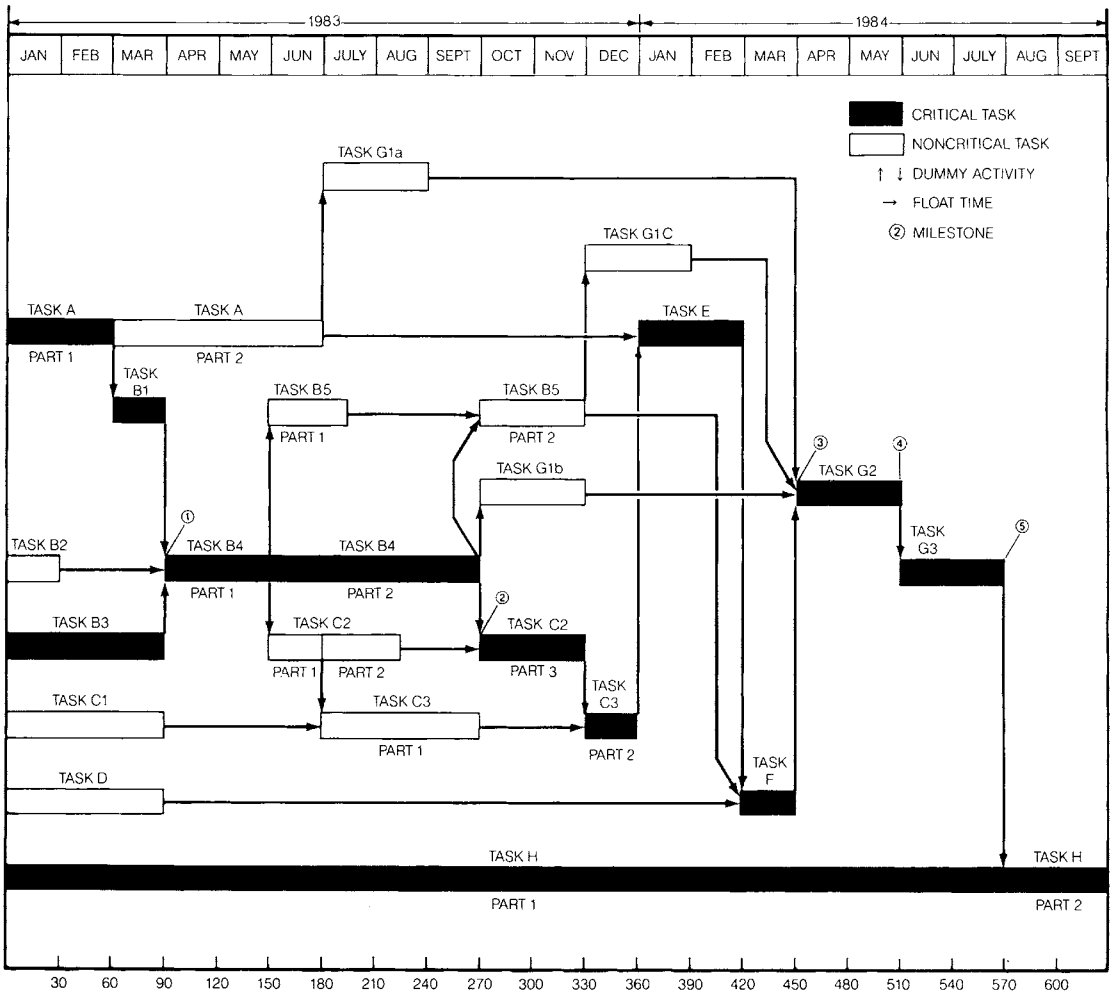


Illustration A-5: Critical Path Diagram



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Chart: Standard Forms of Construction Contract and their Application

Type Of Construction Project Delivery	Contract Form
"Design-Bid-Build"	**CCDC 2** *Stipulated Price Contract*
"Time and Materials"	**CCDC 3** *Cost Plus Contract (percentage or fixed fee)*
"Maximum Upset Price"	**CCDC 3** *Cost Plus Contract (guaranteed maximum price)*
Unit Rates	**CCDC 4** *Unit Price Contract*
Construction Management	**CCDC 5a** *Construct Management Contract — For Services* **CCDC 5b** *Construction Management Contract — For Services and Work*
Design-Build	**CCDC 14** *Design-Build Stipulated Price Contract*
Project Management	n/a

Note: This is a very simplified representation of various types of construction project delivery as well as different pricing mechanisms and contract forms.



2.3 Management of the Project

2.3.3 Cost Planning and Control

Canadian Handbook of Practice for Architects

2.3.3

Introduction
- Providing Advice on Costs
- The Role of the Architect in Cost Planning and Control
- Formats for Presentation of Cost Information
- Liability of the Architect

Methods of Preparing Cost Estimates
- General
- Classes of Cost Estimates
- Elemental Costs
- Area
- Volume
- Unit Use

Factors Affecting Costs
- Economic and Political
- Environmental
- Building Type and Design
- Characteristics of the Owner/Client
- Definition of Project Requirements (Functional Program)
- Type of Construction Project Delivery
- Owner's Responsibilities and Timetable
- Other Factors

Techniques
- Cost Consultants
- Construction Price Index
- Publications
- Contingencies

Professional Service for Each Phase of the Project
- Phase A. Pre-agreement Phase
- Phase B. Schematic Design Phase
- Phase C. Design Development Phase
- Phase D. Construction Documentation Phase
- Phase E. Bidding and Negotiation Phase
- Phase F. Contract Administration Phase

Life Cycle Costs

Value Analysis or Value Engineering

Embodied Energy Cost Analysis or Embodied Energy Consumption

Definitions

References

Appendix — Description of the Classes of Estimates used by PWGSC for Construction Costing of Building Projects

Cost Planning and Control

Introduction

The capital cost for the construction of the project is generally established by the client during the pre-design phase, expressed in terms of a construction budget corresponding to the relative size of the building.

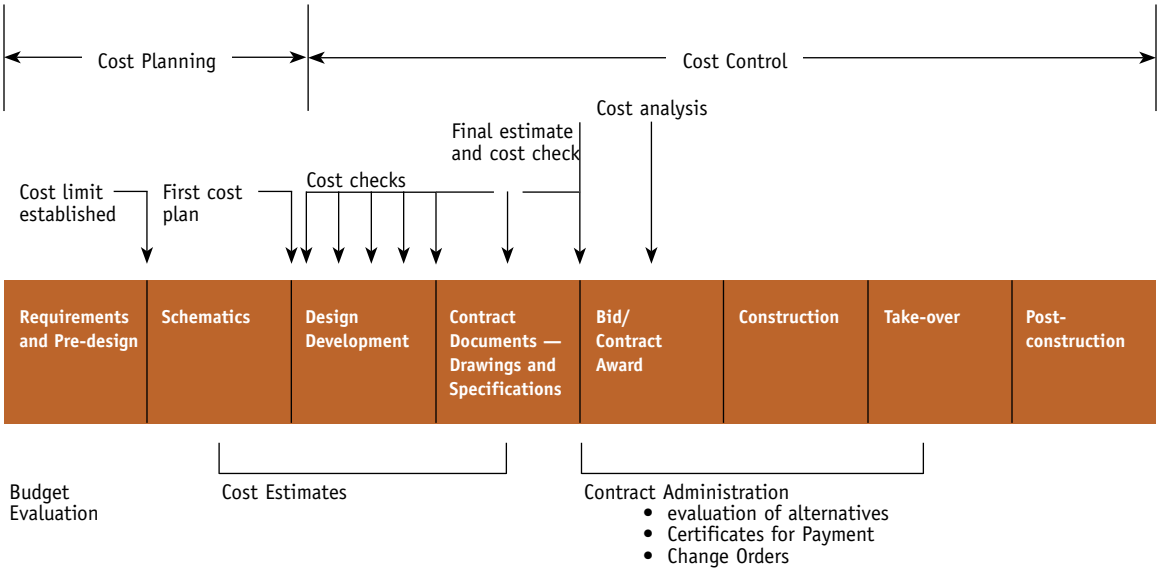
The importance of cost planning and control in the delivery of professional architectural services cannot be overemphasized. Clients are unlikely to allow their architect to proceed unless the architect first estimates the cost of a venture and then monitors the process. Cost management is more common today because of increased expertise in this field and the availability of sophisticated analytical tools.

Providing Advice on Costs

In most client-architect agreements, one responsibility of the architect is to prepare a construction cost estimate. This estimate is **neither a quotation nor a guarantee**. Due to the variable market conditions, the architect should never guarantee or warrant a construction cost estimate. In fact, such a warranty could void any professional liability insurance policy. Nevertheless, the architect is expected to deliver the normal, professional standard of care in preparing cost estimates and providing cost advice.

Whenever suitably experienced personnel are not available in-house, architects or owners should hire the best available cost consultants. If preferred, the architect or cost consultant should form an alliance with business associates who are contractors or in the development industry, or they should establish an ongoing relationship with a quantity surveyor.

Illustration 1: Cost Planning and Control by Project Stages



The Role of the Architect in Cost Planning and Control

To ensure that the project will be well-defined and realized within a predicted cost limit, cost planning (also known as cost control, cost analysis, or cost management) requires:

- effective cost estimating;
- financial analysis of various components;
- management of the design and construction documentation process.

Cost planning (or the preparation of construction cost estimates) is done in the predesign and design stages, whereas cost control (or the monitoring of construction costs) is done at the later stages. Refer to Illustration 1.

Formats for the Presentation of Cost Information

The client usually summarizes overall project costs in a "Global" or Project Budget which:

- lists all expenditures needed to complete every aspect of the venture;
- incorporates information provided by the architect for the construction component of the budget with a detailed breakdown.

Refer to Illustration 2 which suggests some of the "global" and "soft" costs that must be considered.

Prior to delivering cost advice on a regular basis, the architect should:

- make the provision of cost advice and project cost management a priority;
- make specific efforts to become knowledgeable;
- develop in-house experience and skills;
- maintain up-to-date records of historic cost data;
- emphasize to clients the importance of cost estimating and related services.

To ensure effective cost management, every team member must be vigilant about the effect that all design, detailing or specification decisions could have on the cost of individual components of the project, estimated during the initial budget preparation. The project manager will:

- initiate and control the preparation of cost information;
- manage team members to ensure that the work stays within the agreed-upon budget;
- set or adjust limits;
- exercise maximum influence on decisions affecting costs.

Once equipped with access to reliable and current cost information available at all stages of a project, architects should:

- use this resource with confidence;
- express information in standard formats;
- be consistent and methodical;
- avoid ambiguity;
- list all assumptions clearly whenever cost information is published;
- promptly confirm in writing any cost information provided verbally;
- consider providing references and comparable projects when issuing information;
- start a cost information file for each project and keep it updated;
- analyze each project on completion (refer to Chapter 2.3.1, *Management of the Project*);
- maintain files containing reliable historic cost data;
- check historic cost data in detail to ensure comparability with the current project.

Liability of the Architect

In an architectural practice, liability for incorrect cost estimates cannot be avoided, whether or not the architect is acting as the project manager or is providing limited services with no management responsibilities.

Methods of Preparing Cost Estimates

General

Cost forecasting is an important and rigorous activity. All cost estimates:

- work on the principle of forecasting based on **historic** data;
- require that the original data be selected, carefully and methodically, by experienced personnel.

The success of any method depends on:

- the **reliability** of the raw historic data:
- the ability to **adjust** the data to suit the characteristics of the new project and to market conditions;
- the **similarity** of the new project in as many ways as possible to the examples from which data are available;
- the extent to which the analysis is broken down into a large number of **small components**, instead of a few large unit headings.

Therefore, historic data must contain as much descriptive detail as possible, so that differences may be identified and precise adjustments made.

Classes of Cost Estimates

Government and institutional clients commonly use this method, and usually refer to these estimates as Class "C" Estimate, Class "B" Estimate, etc. Refer to "Appendix — Description of the Classes of Estimates used by PWGSC for Construction Costing of Building Projects" at the end of this chapter. From the outset of the project, cost information is arranged under the standard **MasterFormat**™ divisions, which uses the typical trade and supplier headings that will eventually be used during construction. This same format is usually used by contractors for preparing tenders and for the preparation of applications for payment. The data in this format simplify retrieval (from files or electronic sources) for calculating detailed budgets for the next project.

The following is a description of each level:

- Cost Estimate Class D:
- *Functional Program*

- Prepared prior to commencement of the design;
- based on
  the functional program and historic data;
  adjusted to take into account assumptions
  regarding inflation, location, risk, quality, size and project timing;
- a rough order of magnitude.

Cost Estimate Class C:
Schematic Design

- prepared at an early stage in the project, when drawings are preliminary in nature;
- based on:
  type of construction;
  quantities of materials;
- includes all assumptions or qualifications to the estimate;
- includes a relatively large design contingency allowance which is used to provide for changes in scope and because information is more limited.

Cost Estimate Class B:
Design Development

- the estimating process is repeated when additional specification and drawing information becomes available, using an expanded format under the original headings;
- the reduction in uncertainty made possible by better information from the design team allows for a reduced design contingency allowance.

Cost Estimate Class A:
Construction Documentation

- as the construction documents become more complete, the process continues and the contingency allowance is reduced further.

Advantages:
- the most reliable method if undertaken carefully from the start;
- well-suited when cost advice is being supplied to the architect by contractor/construction managers and suppliers;
- the information stays current and relevant throughout pre-construction;
- project leaders can build up a history of, and the knowledge and skills for, cost estimating — especially if building projects are similar within the architectural practice.

Disadvantages:
- requires an estimator with both design and construction experience;
- requires the ability to foresee all the typical trades needed to complete the building.

Refer to Illustration 3 for an application of this estimating method.

Illustration 2: Project Budget

Typical Industrial Manufacturing Building	Original Budget	Variance	Last Budget	Variance	Current Reporting Budget	Notes
Land						
Land purchase price	$ -	0	$ -	0	$ -	
Land transfer tax	$ -	0	$ -	0	$ -	
Legal fees	$ -	0	$ -	0	$ -	
Construction						
Building	$ -	0	$ -	0	$ -	
Contingency	$ -	0	$ -	0	$ -	
Equipment	$ -	0	$ -	0	$ -	
Racking	$ -	0	$ -	0	$ -	
Permit	$ -	0	$ -	0	$ -	
Insurance	$ -	0	$ -	0	$ -	
Parkland dedication	$ -	0	$ -	0	$ -	
Development charges	$ -	0	$ -	0	$ -	
Sewer impost levy	$ -	0	$ -	0	$ -	
Service connections	$ -	0	$ -	0	$ -	
Owners FF&E	$ -	0	$ -	0	$ -	
General contractors bonding	$ -	0	$ -	0	$ -	
Design						
Architect	$ -	0	$ -	0	$ -	
Structural Engineer	$ -	0	$ -	0	$ -	
Mechanical Engineer	$ -	0	$ -	0	$ -	
Electrical Engineer	$ -	0	$ -	0	$ -	
Soils Test/Environmental	$ -	0	$ -	0	$ -	
Landscape Consultant	$ -	0	$ -	0	$ -	
Equipment Engineer	$ -	0	$ -	0	$ -	
Cost Planning	$ -	0	$ -	0	$ -	
Surveyor	$ -	0	$ -	0	$ -	
Misc. fees	$ -	0	$ -	0	$ -	
Legal & Administration						
Legal fees	$ -	0	$ -	0	$ -	
Development Management	$ -	0	$ -	0	$ -	
Project Management	$ -	0	$ -	0	$ -	
Realty Taxes	$ -	0	$ -	0	$ -	
Site Plan & Misc. costs	$ -	0	$ -	0	$ -	
Marketing/Pre-opening/ Commissions						
Marketing/sales/ leasing commissions	$ -	0	$ -	0	$ -	
Utilities prior to opening	$ -	0	$ -	0	$ -	
Commissions	$ -	0	$ -	0	$ -	
Finance						
Commitment fees	$ -	0	$ -	0	$ -	
L.C. fees	$ -	0	$ -	0	$ -	
Project Manager	$ -	0	$ -	0	$ -	
Interim finance	$ -	0	$ -	0	$ -	
Appraisal	$ -	0	$ -	0	$ -	
Contingency						
Design contingency	$ -	0	$ -	0	$ -	
Construction contingency	$ -	0	$ -	0	$ -	
Escalation						
Government Taxes						
GST on monthly payments		0		0		
GST monthly input credits		0		0		
Project Total	$ -	0	$ -	0	$ -	

Illustration 3: Uniformat Estimates

Summary Page Budget Status	Schematic Design Level 1 Budget	Contingency	Variance %	Design Developmt Level 2 Budget	Contingency	Variance %	Construction Documents Level 3 Budget	Contingency
1. General requirements	$ -	$ -	0%	$ -		0%	$ -	
2. Site Work	$ -		0%	$ -		0%	$ -	
3. Concrete	$ 65,000	$ 15,000	115%	$ 75,000	$ 7,500	107%	$ 80,000	$ 4,000
4. Masonry	$ -		0%	$ -		0%	$ -	
5. Metals	$ -		0%	$ -		0%	$ -	
6. Wood and Plastics	$ -		0%	$ -		0%	$ -	
7. Thermal and Moisture Protection	$ -		0%	$ -		0%	$ -	
8. Doors and Windows	$ -		0%	$ -		0%	$ -	
9. Finishes	$ -		0%	$ -		0%	$ -	
10. Specialties	$ -		0%	$ -		0%	$ -	
11. Equipment	$ -		0%	$ -		0%	$ -	
12. Furnishings	$ -		0%	$ -		0%	$ -	
13. Special Construction	$ -		0%	$ -		0%	$ -	
14. Conveying	$ -		0%	$ -		0%	$ -	
15. Mechanical	$ -		0%	$ -		0%	$ -	
16. Electrical	$ -		0%	$ -		0%	$ -	
Total Construction Contingency %	$ -		0%	$ -		0%	$ -	
Total Construction	**$ -**		**0%**	**$ -**		**0%**	**$ -**	

3 Concrete Budget Status	Schematic Design Level 1 Budget	Contingency	Variance %	Design Developmt Level 2 Budget	Contingency	Variance %	Construction Documents Level 3 Budget	Contingency
STRUCTURAL CAST-IN-PLACE FORMWORK				$ 20,000				
Accessories							$ 1,500	$ 75
Expansion joints							$ 1,000	$ 50
Elevated slabs							$ 10,000	$ 500
Footing							$ 2,000	$ 100
Slab on Grade							$ 2,000	$ 100
Walls							$ 2,500	$ 125
Stairs							$ 4,000	$ 200
CONCRETE REINFORCEMENT				$ 10,000				
Reinforcing steel							$ 9,000	$ 450
W.W. Fabric							$ 3,000	$ 150
CAST-IN-PLACE CONCRETE				$ 35,000				
Admixtures							$ 1,000	$ 50
Ready Mix							$ 17,000	$ 850
Elevated slabs							$ 7,000	$ 350
Footings							$ 2,000	$ 100
Slab on Grade							$ 5,000	$ 250
Walls							$ 2,000	$ 100
Stairs							$ 3,000	$ 150
CONCRETE FINISHING				$ 10,000				
Floors							$ 6,000	$ 300
Walls							$ 2,000	$ 100
TOTAL DIVISION 3 — CONCRETE	**$ 65,000**	**$ 15,000**		**$ 75,000**	**$ 7,500**		**$ 80,000**	**$ 4,000**

Elemental Costs

Quantity surveyors often use the elemental cost method as the standard format for presenting cost information. This method:

- divides the building into major elements such as structure, exterior closure;
- uses these elements to provide a cost framework which is useful throughout the life of the project;
- is applicable to new or existing buildings;
- uses these elements to form the basis for applying relevant cost information from similar projects.

Advantages:
- the process assumes that the approximate size of a building is known;
- the process can proceed without construction drawings and specifications;
- particularly useful for architects during design development, when trade-offs between elements can be considered to improve the quality of the project without compromising the total budget.

Disadvantages:
- cuts across the traditional construction trade areas (refer to "Classes of Cost Estimates" section above);
- can be difficult to double-check information from real project data without complex, time-consuming analysis.

The elemental cost method is best left to quantity surveyors or those experienced in the calculation of building costs, unless the architect has extensive in-house records which have been analyzed and are easily accessible.

Refer to Illustration 4 for a typical elemental cost forecast.

Area
(Cost per m^2/per ft^2)

The terms "cost per square metre/per square foot" are used throughout the development and construction industries, and are recognized by public and private institutions and the public at large. Both imperial and metric measurements continue to be used.

Extensive floor area cost data are available from a number of sources as a basis for interpolation and use in forecasting. These should be used when providing general cost advice and for the calculation of overall project costs.

Advantages:
- the concept of "floor area" is easily understood and applicable to all buildings;
- costs for an individual component or element of a building, or for the entire structure, are straightforward to calculate;
- very simplified historic cost information, expressed as costs per m^2/per ft^2 for completed projects, is available for many different building types.

Disadvantages:
- does not account for unique conditions or special construction;
- is simplistic and can be misinterpreted.

The architect should limit the use of this basic information by using it only as a general guide at the pre-design stage.

Refer to Illustration 5 for typical data provided for preparing a construction cost estimate based on area.

Volume
(Cost per m^3)

This method is not widely used, except:

- for certain specialized building types such as warehousing (particularly freezer buildings);
- for multi-storey buildings where the floor area method might not adequately reflect the true costs;
- as a double-check on the other methods being used.

Unit Use
(Cost per bed, cost per seat, etc.)

This method uses very simplified historic data as a basis for calculating cost. It is brief, to the point, and relatively reliable — provided that the historic data on projects are comparable. This method is useful for preliminary budgeting because the result is general in nature and more obviously "approximate."

Illustration 4: Elemental Cost Forecast

	Typical Example of Elemental Format using Canadian Institute of Quantity Surveyors Measurement and Pricing Method	Elemental Quantity SF	Elemental Unit Rate $/SF	Elemental Amount	Cost/SF $/SF	Total $	%
A	**SHELL**						
	A1 SUBSTRUCTURE						
	A11 Foundation	252,800	$ 3.75	$ 948,000	$ 3.39	$ 948,000	3.96%
	A12 Basement Excavation	0	$ -				
	A2 STRUCTURE						
	A21 Lowest floor construction	252,800	$ 10.00	$ 2,528,000	$ 9.03		
	A22 Upper floor construction	27,205	$ 11.98	$ 325,916	$ 1.16		
	A23 Roof construction	252,800	$ 12.00	$ 3,033,600	$ 10.83	$ 5,887,516	24.61%
	A3 EXTERIOR ENCLOSURE						
	A31 Walls below grade	0	$ -	$ -	$ -		
	A32 Walls above grade	64,800	$ 7.99	$ 517,752	$ 1.85		
	A33 Windows & Entrance	1,656	$ 50.12	$ 82,999	$ 0.30		
	A34 Roof coverings	252,800	$ 4.00	$ 1,011,200	$ 3.61		
	A35 Projections	64,800	$ 0.77	$ 49,896	$ 0.18	$ 1,661,847	6.95%
B	**INTERIORS**						
	B1 PARTITIONS						
	B11 Partitions	179,915	$ 7.19	$ 1,293,589	$ 4.62	$ 1,525,589	6.38%
	B12 Doors	232 no	$ 1,000.00 ea	$ 232,000			
	B2 FINISHES						
	B21 Floor Finishes	266,005	$ 2.00	$ 532,010	$ 1.90	$ 747,742	3.13%
	B22 Ceiling Finishes	266,005	$ 0.38	$ 101,082	$ 0.36		
	B23 Wall Finishes	424,630	$ 0.27	$ 114,650	$ 0.41		
	B3 FITTING & EQUIPMENT						
	B31 Fitting & Fixtures	280,005	$ 0.18	$ 50,401	$ 0.18		
	B32 Equipment	280,005	$ 0.45	$ 126,002	$ 0.45		
	B33 Conveying Systems	0	$ -	$ 50,000	$ 0.18	$ 226,403	0.95%
C	**SERVICES**						
	C1 MECHANICAL	280,005	$ 22.50	$ 6,300,113	$ 22.50	$ 6,300,113	26.33%
	C11 Plumbing & Drainage						
	C12 Fire Protection						
	C13 HVAC						
	C14 Controls						
	C2 ELECTRICAL	280,005	$ 6.00	$ 1,680,030	$ 6.00	$ 1,680,030	7.02%
	C21 Service & Distribution						
	C22 Lighting, Devices & Heating						
	C23 Systems & Ancillaries						
NET BUILDING COST excluding site					**$ 67.78**	**$ 18,977,239**	**79.31%**
D	**SITE**						
	D1 SITE WORK			$ 1,300,000	$ 4.64	$ 1,300,000	5.43%
	D11 Site Development			$ 1,000,000	$ 3.57		
	D12 Mechanical Site services			$ 200,000	$ 0.71		
	D13 Electrical Site services			$ 100,000	$ 0.36		
	D2 ANCILLARY WORK				$ -	$ -	
	D21 Demolition			$ -	$ -		
	D22 Alterations			$ -	$ -		
NET BUILDING COST including site					**$ 72.42**	**$ 20,277,239**	**84.75%**
Z	MARK UPS						
	Z1 GENERAL REQUIREMENTS						
	Z11 General requirements	7%		$ 1,419,406.74	5.06930978	$ 1,419,407	5.93%
TOTAL CONSTRUCTION ESTIMATE excluding contingency							
	Z2 CONTINGENCIES	11%		2,230,496.303	$7.97	$ 2,230,496	9.32%
	Z21 Design contingency	0%					
	Z22 Escalation contingency	6%		1,216,634.347	$ 4.35		
	Z23 Construction contingency	5%		1,013,861.956	$ 3.62		
GOODS AND SERVICES TAX		EXCLUDED				$ -	
TOTAL CONSTRUCTION ESTIMATE including Allowances					**$ 85.45**	**$ 23,927,142**	**100.00%**
Gross Floor Area 280 000 sf							

Advantages:

- provides a quick reference or check at the early design stages.

Disadvantages:

- projects are rarely identical, so careful adjustment must be made for differences;
- the circumstances, location, and date of construction may render the historic information of questionable value, even though the projects may be very similar in physical form;
- the calculation of differences may require extensive analysis of the information using some of the other methods referred to above (sometimes, this is best done by quantity surveyors).

Architects should:

- use this method with caution, for preliminary advice only, and as a convenient double-check for comparison purposes;
- spell out clearly all qualifications and assumptions when the information is released.

Do not confuse *unit use* with the term *unit cost* which can be expressed in a number of different numerical unit forms and is a technique used for calculating building and component costs:

Unit Cost	e.g., Concrete curbs:	$13 lf (linear foot)
	Lavatory — wall hung	$1,090 ea (each)
Unit Use	e.g., 2,000 seat cinema	@ $1,500 per seat
	60-room motel	@ $125,000 per room

Illustration 5: Typical Data used in the Area Method Cost Forecast

Typical Page From Toronto Real Estate Board Schedule of Unit Costs' price $ 10.00		Jan-97 per/SF	Jan-97 per/SM	Jan-96 per/SF	Jan-96 per/SM	Jan-95 per/SF	Jan-95 per/SM	Jan-94 per/SF	Jan-94 per/SM
1 INDUSTRIAL BUILDING									
16 ft clear height	Under 10 000 sf	**$ 55.51**	$ 597.29	**$ 55.01**	$ 591.91	**$ 53.93**	$ 580.29	**$ 51.03**	$ 549.08
	10 000 - 20 000 sf	**$ 46.11**	$ 496.14	**$ 45.70**	$ 491.73	**$ 44.80**	$ 482.05	**$ 42.39**	$ 456.12
	20 000 - 50 000 sf	**$ 38.31**	$ 412.22	**$ 37.96**	$ 408.45	**$ 37.22**	$ 400.49	**$ 35.22**	$ 378.97
	50 000 - 150 000 sf	**$ 33.24**	$ 357.66	**$ 32.94**	$ 354.43	**$ 32.29**	$ 347.44	**$ 30.56**	$ 328.83
	Over 150 000 sf	**$ 31.31**	$ 336.90	**$ 31.03**	$ 333.88	**$ 30.42**	$ 327.32	**$ 28.78**	$ 309.67
18 ft clear height	Under 10 000 sf	**$ 57.49**	$ 618.59	**$ 56.97**	$ 613.00	**$ 55.85**	$ 600.95	**$ 52.85**	$ 568.67
	10 000 - 20 000 sf	**$ 47.55**	$ 511.64	**$ 47.12**	$ 507.01	**$ 46.20**	$ 497.11	**$ 43.72**	$ 470.43
	20 000 - 50 000 sf	**$ 39.27**	$ 422.55	**$ 38.91**	$ 418.67	**$ 38.15**	$ 410.49	**$ 36.10**	$ 388.44
	50 000 - 150 000 sf	**$ 33.84**	$ 364.12	**$ 33.54**	$ 360.89	**$ 32.88**	$ 353.79	**$ 31.11**	$ 334.74
	Over 150 000 sf	**$ 31.62**	$ 340.23	**$ 31.33**	$ 337.11	**$ 30.72**	$ 330.55	**$ 29.07**	$ 312.79
22 ft clear height	Under 10 000 sf	**$ 58.45**	$ 628.92	**$ 57.92**	$ 623.22	**$ 56.78**	$ 610.95	**$ 53.73**	$ 587.13
	10 000 - 20 000 sf	**$ 48.22**	$ 518.85	**$ 47.79**	$ 514.22	**$ 46.85**	$ 504.11	**$ 44.33**	$ 476.99
	20 000 - 50 000 sf	**$ 40.80**	$ 439.01	**$ 40.43**	$ 435.03	**$ 39.64**	$ 426.53	**$ 37.51**	$ 403.61
	50 000 - 150 000 sf	**$ 34.46**	$ 370.79	**$ 34.15**	$ 367.45	**$ 33.48**	$ 360.24	**$ 31.68**	$ 340.88
	Over 150 000 sf	**$ 32.94**	$ 354.43	**$ 32.64**	$ 351.21	**$ 32.00**	$ 344.32	**$ 30.28**	$ 325.81
25 ft clear height	Under 10 000 sf	**$ 59.00**	$ 634.84	**$ 58.47**	$ 629.14	**$ 57.32**	$ 616.76	**$ 54.24**	$ 583.62
	10 000 - 20 000 sf	**$ 49.67**	$ 534.45	**$ 49.23**	$ 529.71	**$ 48.26**	$ 519.28	**$ 45.67**	$ 491.41
	20 000 - 50 000 sf	**$ 41.11**	$ 442.34	**$ 50.74**	$ 545.96	**$ 39.94**	$ 429.75	**$ 37.79**	$ 406.62
	50 000 - 150 000 sf	**$ 34.48**	$ 371.00	**$ 34.17**	$ 367.67	**$ 33.50**	$ 360.46	**$ 31.70**	$ 341.09
	Over 150 000 sf	**$ 33.22**	$ 357.45	**$ 32.92**	$ 354.22	**$ 32.27**	$ 347.23	**$ 30.54**	$ 328.61

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Additional information contained in *Schedule of Unit Costs* can be obtained through the Toronto Real Estate Board.

Factors Affecting Costs

Economic and Political

Several factors influence the construction industry and affect building costs. These factors include:

- inflation;
- market conditions;
- other economic factors;
- political and social climate.

Inflation

Due to economic cycles, inflation and the consequent escalation of construction costs can vary depending on the era and the economic factors affecting Canada and the world. Because inflation is a factor of the cyclical economic system, especially for construction, architects should:

- always include an allowance for escalation as a line item in the project budget;
- be aware of the trend during the past 12 months as well as predictions for the future;
- indicate a reference date on all estimates
- seek input from the client.

Market Conditions

Periodically, there is so much demand for construction that it can become almost impossible to obtain competitive tenders for a project. This situation results in inflated costs. At the other extreme, construction costs during recessions — particularly for non-union labour rates — may decrease significantly. Such decreases can be followed by a rapid rise in costs shortly after the end of the recession.

Other Economic Factors

- the use of union or non-union labour;
- interest rates on financing costs;
- large demand for certain building materials;
- exchange rates between nations, for projects with a significant proportion of imported materials and equipment.

Political and Social Climate

In Canada, the political climate (local, provincial, and federal) can affect the timing of a project approval, especially around election time.

Abroad, in countries where democracy and respected institutions are stable, commercial activity can flourish, and competition and true supply and demand will occur. In certain areas of the world — where some or all of these factors may be missing — stability is often lacking and construction prices will tend to be erratic and unpredictable.

Prior to using any raw cost data for estimates, architects and cost consultants should consider all the above factors and make suitable corrections.

Environmental

Construction costs are affected by several environmental factors:

- site characteristics;
- weather, and season of the year;
- location.

Site Characteristics

- challenging topography;
- natural or built features;
- unusual soil or sub-surface conditions;
- existence of hazardous wastes, including asbestos, PCBs;
- contaminated soils requiring removal and/or environmental certification;
- disposal costs of contaminated soils;
- adjacent buildings.

Weather and Season

- cost and construction procedures in Canada are significantly influenced by the weather and season;
- construction activities are cyclical over each 12-month period (reduced activity from December through March for exterior construction and excavation);
- winter protection and provision of temporary heating adds to cost.

Location

- site characteristics (for example, a project in a suburban location will cost less compared to one in a constricted downtown core — where overhead can be much higher because of parking charges, traffic congestion causing loss of time and delivery delays, and the likelihood of more stringent regulatory requirements);
- construction in remote areas where skilled labour is unavailable;

- distance to sources of supply for materials and trades;
- use of components that are manufactured at some distance from the site;
- travel distance to dump/disposal sites or recycling depots.

Building Type and Design

Building types range from simple wood-framed structures to complex, technically sophisticated buildings such as hospitals and laboratories. Some costing handbooks classify building costs under as many as several dozen different types. Construction costs vary considerably ($575-$3,700 per m2/$55-$350 per ft2 in Canadian dollars).

Features affecting cost include:

- compliance with building codes;
- method of construction (for example, wood, reinforced concrete or steel frame);
- building height and number of storeys;
- building form (a compact building is less expensive than one with the same area that is long and narrow);
- type and range of finishes;
- choice and arrangement of structural, mechanical, and electrical systems;
- the planned life of the structure;
- selection of components (standard or off-the-shelf vs. custom-manufactured);
- sustainable design requirements such as material selection and requirements for certification.

Characteristics of the Owner/Client

Architects need to recognize the impact that the type of owner can have on the cost of a project.

Sophisticated clients, such as commercial and industrial corporations or developers who regularly procure design services and construction, frequently expect the delivery of completed projects at or below target costs.

Other owners, such as certain institutions and government agencies, have entrenched bureaucratic procedures that effectively preclude taking advantage of a competitive system. Some owners are unable or unwilling to avoid certain factors which can contribute significantly to project costs.

These factors include:

- design requiring high standards of quality or rigorous quality control procedures (especially long life cycle, redundancies in spaces);
- complex bidding procedures;
- insurance requirements above the norm;
- extensive bonding requirements;
- poorly written, sometimes inequitable, non-standard contract wording;
- long delays in issuing payments to contractors.

The architect should consider adjusting the estimate based on the type of organization the client represents.

Definition of Project Requirements (Functional Program)

Refer to Chapter 2.3.4, *Pre-design*.

The functional program defines the project. To minimize the possibility of cost overruns resulting from changes in the program, review the functional intent or objectives. Ask the owner to clarify any incomplete or unclear requirements prior to providing any architectural service.

Changes in the scope of a project can occur for many reasons, including:

- the development of more specific detailed requirements by the owner;
- external factors such as new technological developments, new legislation or a change in market conditions;
- lack of sufficient detailed information;
- a change in client personnel, building users or stakeholders;
- inadequate research prior to developing the program;
- the addition of new partners or stakeholders.

Cost increases due to changes in the program can be significant for the owner and the architect at any time, but especially in the construction documentation stage, when re-design costs and additional consulting fees arise. Refer to Illustration 7.

The architect should always keep the owner fully advised of the potential cost implications of any changes.

Type of Construction Project Delivery

Contractual relationships between the owner and the contractor can have an impact on the cost of a project. Refer to Chapter 2.3.2, *Types of Construction Project Delivery*.

Owner's Responsibilities and Timetable

The owner frequently has requirements which can affect the construction budget. In all cases, these should be discussed and approval subsequently sought from the owner. Some of these circumstances include:

- a project schedule that is accelerated to suit an owner's critical date, such as a school opening or the timing of an event due to market forces;
- late commencement due to reasons beyond the owner's control, for example, winter conditions, resulting in additional construction costs;
- delayed commencement of a project during a time of inflation and currency fluctuations;
- owners approval process.

Architects are advised to:

- ensure that assumptions attached to any forecasts include reference to specific timing;
- check and make adjustments for specific issues that may influence the cost of the project when using historic cost data.

Other Factors

Regulations:

- onerous bureaucratic requirements, such as planning regulations or site development agreement conditions;
- numerous building code occupancy classifications within one building;
- hazardous demolition, such as removal of asbestos;
- recycling regulations and dumping charges (tipping fees) for demolition or construction debris.

Inconvenient or unusual work arrangements:

- construction must be scheduled around the ongoing activities of occupants in buildings such as hospitals, court houses, shopping malls or restaurants; because these activities bear little relationship to the logic of construction, overtime labour costs often result;
- additional protection and clean-up expenditures beyond normal requirements;
- work adjacent to or within certain building types may be subject to limitations on scheduling and on the times when equipment, such as cranes, may be used;
- demolition and shoring of existing structures;
- abnormal construction phasing.

When developing the cost plan of a project, establish the basic cost of the building. Identify and pull out unusual or site-specific costs and justify the overall project budget during the forecasting process.

Techniques

Cost Consultants

Unless the architect has developed the knowledge and systems in-house, expert advice should be obtained either from:

- independent professional experts (quantity surveyors); or
- those intimately involved in everyday construction (development/construction experts).

Quantity Surveyors

Quantity surveyors provide professional service at hourly rates, or at a fixed or percentage fee of the construction budget.

Advantages:

- independent professional status;
- their success is based upon their track record of reliability in forecasting;
- up-to-date archival material that is very extensive for many different building projects and is easily accessible;
- quantity surveyors will usually supply information on comparable projects as a double-check to establish credibility;
- some larger companies publish their own updated forecast information yearly.

Disadvantages:

- unit costs are usually historical and often not connected to real-time costs making them less current than costs available from contractors or construction managers;
- detailed cost information may not be available because cost breakdowns are limited to major trade divisions.

Cost estimating is as much an art as a science and architects are advised to:

- use the services of a quantity surveyor, whenever appropriate, to increase the quality and depth of the architectural service available within the practice;
- monitor every aspect of their work to ensure that the information being prepared is entirely applicable to the current project and that any qualifications or assumptions accompanying the cost information supplied are precisely in accordance with the client's expectations;
- be satisfied that every item of information is relevant before passing on this advice to the client;
- ensure there are sufficient fees: for coordination when Construction Manager is involved, or value analysis or value engineering is undertaken;
- to include the quantity surveyor's fees or cost estimating. [Note: some clients prefer to engage a quantity surveyor directly; in these situations, the architect should allow for fees for coordination.]

Construction Managers and other Development/ Construction Experts

Other sources of expertise directly from the construction industry include construction managers, contractors, design-builders, and developers.

Advantages:

- results are likely to be reliable for calculating costs for various classes of Cost Estimates using unit costs assigned to area measurements for spot-checking individual elements of a project where the proposed building is very similar to recently completed projects;
- information will be very current because these sources are involved with construction spending every day and because they have access to trades and suppliers who are also specialists;
- these sources monitor trends and are generally aware of the dynamics affecting construction costs.

Disadvantages:

- unlike a quantity surveyor, who is an independent consultant, the builder may not always find it easy to achieve a comprehensive overview;
- this knowledge is sometimes very specialized and "narrow," and may not always be applicable to new situations;
- certain sources may be less reliable due to possible self-interest or commercial motives.

Architects should consider:

- developing an alliance with individuals or companies by working together on common projects before using this source for cost information;
- checking the relevance of all data supplied, even if they have confidence in the information source;
- paying a fee for all cost information from construction industry sources.

It should be noted that when there may be a conflict of interest, information from a "free" source may not be reliable.

Construction Price Index

Construction price index data are usually published by government agencies and private companies. These publications are:

- useful only as a guide to show trends;
- usually some months out-of-date;
- often presented in graph form for ease of communication.

Publications

Construction cost data are available from government agencies, private interest groups, private companies, and quantity surveyors. The information comes in printed or electronic form, and the cost varies considerably depending on the amount of detail, completeness, and ease of use. Data from government agencies are more useful for identifying trends and differences in national, regional, and local costs than for calculating the cost of a specific building.

Refer to Illustration 6 for an example of cost information from a typical publication. Extensive detailed information for most building types can be purchased in hard copy or electronic form. Such publications:

Illustration 6: Typical Cost Information

Model costs calculated for a 1-storey building with 10′ storey height and 4,000 square feet of floor area

Restaurant, Fast Food

			Unit	Unit Cost	Cost Per S.F.	% Of Sub-Total
A. SUBSTRUCTURE						
1010	Standard Foundations	Poured concrete; strip and spread footings	S.F. Ground	2.57	2.57	
1020	Special Foundations	N/A	—	— —		
1030	Slab on Grade	4" reinforced concrete with vapor barrier and granular base	S.F. Slab	4.74	4.74	8.7%
2010	Basement Excavation	Site preparation for slab and trench for foundation and footing	S.F. Ground	.46	.46	
2020	Basement Walls	4' foundation wall	L.F. Wall	78	5.07	
B. SHELL						
B10 Superstructure						
1010	Floor Construction	N/A	—	—	—	6.0%
1020	Roof Construction	Metal deck on open web steel joists	S.F. Roof	8.90	8.90	
B20 Exterior Enclosure						
2010	Exterior Walls	Face brick with concrete block backup *70% of wall*	S.F. Wall	30.86	14.04	
2020	Exterior Windows	Window wall *30% of wall*	Each	45.75	8.92	20.2%
2030	Exterior Doors	Aluminum and glass	Each	3478	6.96	
B30 Roofing						
3010	Roof Coverings	Built-up tar and gravel with flashing; perlite/EPS composite insulation	S.F. Roof	6.10	6.10	4.4%
3020	Rood Openings	Roof hatches	S.F. Roof	.47	.47	
C. INTERIORS						
1010	Partitions	Gypsum board on metal studs *25 S.F. Floor/L.F. Partition*	S.F. Partition	5.78	2.08	
1020	Interior Doors	Hollow core wood *1000 S.F. Floor/Door*	Each	488	.49	
1030	Fittings	N/A	—	—	—	
2010	Stair Construction	N/A	—	—	—	17.6%
3010	Wall Finishes	Paint	S.F. Surface	2.47	1.78	
3020	Floor Finishes	Quarry tile	S.F. Floor	15.36	15.36	
3030	Ceiling Finishes	Mineral fiber tile on concealed zee bars	S.F. Ceiling	6.38	6.38	
D. SERVICES						
D10 Conveying						
1010	Elavators & Lifts	N/A	—	—	—	0.0%
1020	Escalators & Moving Walls	N/A	—	—	—	
D20 Plumbing						
2010	Plumbing Fixtures	Kitchen, bathroom and service fixtures, supply and drainage *1 Fixture/400 S.F. Floor*	Each	3092	7.73	
2020	Domestic Water Distribution	Gas fired water heater	S.F. Floor	4.52	4.52	9.4%
2040	Rain Water Drainage	Roof drains	S.F. Roof	1.65	1.65	
D30 HVAC						
3010	Energy Supply	N/A	—	—	—	
3020	Heat Generating Systems	Incuded in D3050	—	—	—	
3030	Cooling Generating Systems	N/A	—	—	—	12.2%
3050	Terminal & Package Units	Multizone unit, gas heating, electric cooling; kitchen ventilation	S.F. Floor	18.15	18.15	
3090	Other HVAC Sys. & Equipment	N/A	—	—	—	
D40 Fire Protection						
4010	Sprinklers	Sprinklers, light hazard	S.F. Floor	6.12	6.12	5.2%
4020	Standpipes	Standpipe	S.F. Floor	1.66	1.66	
D50 Electrical						
5010	Electrical Service/Distribution	400 ampere service, panel board and feeders	S.F. Floor	4.30	4.30	
5020	Lighting & Branch Wiring	T-8 fluorescent fixtures, receptacles, switches, A.C. and misc power	S.F. Floor	9.89	9.89	12.2%
5030	Communications & Security	Addressable alarm systems and emergency lighting	S.F. FLoor	3.44	3.44	
5090	Other Electrical Systems	Emergency generator, 7.5 kW	S.F. Floor	.38	.38	
E. EQUIPMENT & FURNISHING						
1010	Commercial Equipment	N/A	—	—	—	
1020	Institutional Equipment	N/A	—	—	—	4.1%
1030	Vehicular Equipment	N/A	—	—	—	
1090	Other Equipment	Walk-in refrigerator	S.F. Floor	6.06	6.06	
F. SPECIAL CONSTRUCTION						
1020	Integrated Construction	N/A	—	—	—	0.0%
1040	Special Facilities	N/A	—	—	—	
G. BUILDING SITEWORK N/A						
				Sub Total	148.22	**100%**
	CONTRACTOR FEES (General Requirements: 10%, Overhead: 5%, Profit: 10%))			25%	37.06	
	ARCHITECT FEES			8%	14.82	
				Total Building Cost	**200.10**	

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- provide excellent, comprehensive, and reliable data if used with appropriate qualifications or multipliers;
- are assembled from real project data supplied by owners and contractors from the previous year;
- are available for Canada only, or for all of North America (amounts can be adjusted to the individual cities or regions).

The data may be used for entire buildings or individual components. Note that the data are more reliable for estimating in Canada when obtained from Canadian publications or sources. Data from non-Canadian sources may not be reliable for estimating purposes when the value of the dollar is fluctuating.

Architects should:

- build forecasts using this data carefully and methodically;
- carefully read the descriptions of the scope and cost allowances to ensure that the proposed building estimate is based on a comprehensive list of items which apply exactly;
- become familiar with the format and methods employed prior to using any information.

Contingencies

Theoretically, every budget estimate should predict the actual (final) cost of the completed project. In practice, this means that contingency allowances of decreasing size must be applied to project and construction budgets as relevant information develops during the design process. There are two contingencies and it is important to distinguish between design contingencies and construction contingencies and identify both in any estimate in addition to any escalation amount. Contingencies, which may be as high as 25% at the early stages of a project, will decrease to 2%-5% as the degree of uncertainty is reduced. Construction contingencies for renovation work are higher.

Most government agencies involved in construction, as well as private companies, banks, and other financial institutions, expect a single contingency amount to be shown at the bottom of a budget. This figure, giving the full extent of the contingency allowance, can be plainly seen. However, some project managers prefer the contingency to be apportioned for each line item in addition to showing a general contingency at the end.

Professional Service for Each Phase of the Project

Use a checklist such as the "Checklist for the Management of the Architectural Project" (refer to Chapter 2.3.1, *Management of the Project*) to ensure that all cost estimating tasks are attended to at the appropriate time.

The sections below are a commentary on the lists of tasks.

Phase A. Pre-agreement Phase

By listing all cost-related tasks, the architect:

- ensures that every aspect of spending on the project will be reviewed by either the architect, the client or another party;
- can prepare a complete proposal for services.

The purpose is to:

- make the client aware that this service will be required to complete the entire project;
- identify who will be responsible for investigating and supplying the forecasting information.

Phase B. Schematic Design Phase

In this phase, the architect establishes a preliminary design and a construction cost estimate for the project, based on the most reliable information available at the time from consultants and other specialists. The architect may **either**:

- instruct the design team to continue with conceptual work that will meet or satisfy the agreed-upon budget; **or**
- review the scope, quality and cost for some or all of the building elements to re-define the project to fit within a pre-determined cost limit;
- revise the budget and redefine the scope of the project.

Using up-to-date cost forecasting information, as well as carefully defining the project scope and cost limits for the project elements, will minimize the risk of significant re-design and re-definition later.

Phase C. Design Development Phase

In this phase, the architect may:

- provide for review and updating of the construction cost estimate as the reliability of the design and specifications improves;
- undertake additional analysis, if necessary, to check the construction cost estimate and its assumptions;
- refine the building's scope, design, quality and details, to ensure they will not exceed the limits of the construction cost budget.

Phase D. Construction Documentation Phase

In this phase, the architect may:

- update the construction cost estimate based on the construction documents (often at 50% completion and at 95% completion – the pre-tender stage or at other defined milestones);
- include allowances in the bid documents.

Refer to Chapter 2.3.8, *Construction Documents — Specifications*.

Phase E. Bidding and Negotiation Phase

In preparing the bidding documents, the architect must determine what cost information is needed. The architect must consider the following cost information:

- alternative prices;
- itemized prices;
- unit prices.

Refer also to CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts*.

Traditionally, the architect analyzes the bids. The various "alternative prices" from each bidder must be evaluated and the best overall value for the client determined. The lowest combination of base bid and acceptable alternative prices is normally the choice.

Itemized prices are costs for a specific item or section of work *for information purposes only*. Unit prices should only be requested when an estimated quantity is supplied. Unit prices are typically requested for large civil engineering projects; however, certain components (such as site development work, hidden or indeterminate work) within architectural projects may require unit prices.

Refer also to Chapter 2.3.9, *Construction Procurement*.

RAIC Document Six: The Canadian Standard Form of Contract Between Client and Architect indicates in General Condition 3.4 that if the lowest *bona fide* bid exceeds the construction cost estimate by 15%, the architect shall either:

- obtain approval from the client for an increase in the construction budget;
- re-bid or negotiate;
- modify the construction documents to reduce the construction cost (for no additional fee).

Phase F. Contract Administration Phase

The architect is usually required to determine the amounts owing to the contractor under the contract, based on the architect's observations and evaluation of the progress of the work. The architect then processes the contractor's application for payment and prepares a Certificate for Payment. The elemental cost analysis method is well-suited for use on a comparative basis in assessing the contractor's schedule of values submitted at the outset of the construction phase.

Another architectural service provided during the Contract Administration Phase is the evaluation of the costs of changes. Having ready access to historic cost data, to ensure that the contractor's quotations are realistic, is very important.

Refer also to Chapter 2.3.10, *Contract Administration — Office Functions*.

The architect usually:

- delivers effective cost management service throughout the project;
- provides the owner with regular cost updates and advice (this will occur naturally to some extent during the construction phases when the client receives copies of Proposed Changes, Change Orders, and Certificates for Payment);
- endeavours to maintain the supply of excellent cost advice and well-presented information throughout a project.

Life Cycle Costs

In the past, building costs often considered only initial or capital construction costs and did not always include costs associated with operations and maintenance. Recently, high energy and maintenance costs have highlighted the fact that the "real cost" of a building is not limited to the construction phase. An analysis of life cycle costs is not a basic service but an optional or additional service.

The objective of life cycle costing is to determine the "total cost" of a building over its lifetime. This costing method:

- allows comparisons to be made between alternative components or systems;
- generates an understanding of the design of a project, how it functions, and how costs arise;
- facilitates further development of the design.

Life cycle costing of a building can be expressed as follows:

Total Cost = Capital Cost + Operating Cost + Maintenance Cost

The three types of costs are:

- **capital costs:** the initial cost of constructing the project, including the land, fees, and carrying costs;
- **operating costs:** all expenditures for the servicing of the building during its life period, for example, lighting, energy, management, and insurance;
- **maintenance costs:** those costs associated with repairs and renewals.

The total cost as defined above is relevant to the long-term costs of owning a building and is of special interest to owner-occupiers such as government bodies, condominium corporations, and large institutions.

Before the design development phase begins, the architect should discuss the importance of life cycle costs to the client for the following reasons:

- different construction materials, techniques, and systems have different effective life spans;
- considerable expense can arise during the life of a building to maintain a satisfactory level of performance;
- low construction costs may result in higher maintenance costs later in the life of the building.

Using a pre-determined and agreed-upon "design length of life" as a base, the life cycle costs analysis will:

- assess the initial, maintenance, and replacement costs for each element of a building (for example, different types of mechanical systems and roof membranes can vary significantly in initial cost and in their anticipated serviceable life);
- compare this information with total costs for alternative selections or designs;
- study different combinations of all major elements to identify the best choices to minimize capital cost;
- determine the most advantageous or lowest life cycle cost for the entire structure;
- incorporate operating costs, including energy consumption, in the study.

Architects can effectively undertake most life cycle cost comparison exercises if they have access to adequate cost and material specification information. A more detailed analysis should be undertaken by qualified specialist consultants.

Value Analysis or Value Engineering

Sometimes a project will be subjected to value analysis or value engineering. This service is not a basic service of the architect and is frequently undertaken with the use of an external facilitator. The best time to apply any value analysis is early in the design process. One limitation of value engineering is that it generally does not take into account the architect's logical and sometimes intuitive design process.

Value engineering is a systematic procedure to determine the best or optimum value for investments in a construction project. Value engineering is an analytical approach to modifying features which may add cost to a building but do not contribute to its quality, appearance, useful life or functional performance. Architects usually work with cost consultants and value engineers to compare trade-offs between design concepts, arrangements, materials and finishes, systems, construction techniques as well as capital and life cycle costs. This analysis should begin during the schematic design phase when conceptual drawings and outline specifications are prepared. Ideally, value engineering is planned and scheduled at the outset of a project; however, the architect should be willing to undertake such a study at any stage of the project. As noted above, the best time for value engineering is early in the design process.

Certain project delivery methods are better suited to value engineering and different owners will apply different criteria for such studies. For example, developers or Design-Builders may plan to dispose of an asset soon after construction, with more interest in reducing capital spending and less interest in life cycle costs. Landlords and building owners may be more concerned about reduced operating and maintenance costs as well as lower replacement costs. Lower capital costs are almost always a significant consideration. The objective should be to minimize construction cost while maintaining quality through the substitution of alternative materials and systems.

The owner may choose to engage an independent reviewer, rather than the architect/engineers of record, in the belief that this will be more likely to achieve the desired results. This approach can sometimes result in the substitution of inferior or inappropriate products, simply because they are cheaper, however, this is not true value engineering but rather cost-cutting. In these circumstances, the architect must be informed and given the opportunity to advise the owner on the consequences of the proposed changes.
The architect should document all changes in construction documentation requested by the owner. The architect should provide written comments and recommendations on all changes, and clearly describe the positive and negative aspects of the substitutions.

Embodied Energy Cost Analysis or Embodied Energy Consumption

This type of cost analysis assesses the environmental impacts and energy consumption resulting from the extraction, manufacture, delivery, installation, demolition, and recycling of building materials in buildings.

Increasing emphasis is being placed on the need to conserve natural and manufactured building materials and to reduce the embodied energy contained within all products used in building construction.

Work in this field is frequently undertaken by specialists. Architects are well equipped to develop knowledge and skills in this area of expertise, rather than relinquishing the field to others.

Definitions

Construction Budget: The client's budget for the construction cost, including contingencies for cost increases.

Element: Term used in cost estimating to describe a component of a building, such as *sub-structure* (footings, foundations) or *envelope* (walls and roof).

Estimate: To form and state a general idea of; an opinion or judgement (as to such factors as value, time, size).

Indexing: Applying an index or factor to adjust costs for one geographic region to another. (A typical index might be expressed as a percentage such as 102.7%.)

Project Budget: The client's estimated total expenditure for the entire project. It includes, but is not limited to, the construction budget, professional fees, costs of land, rights of way, and all other costs to the client for the project.

Quantity Survey: A bill of quantities or a detailed listing and quantities of all items of material and equipment necessary to construct a project.

References

American Society for Testing Materials (ASTM). publishes 24 various standards on from the Committee E06.81 on Building Economics.
www.astm.org/COMMIT/SUBCOMMIT/E0681.htm

Canadian Institute of Quantity Surveyors.

Quantity Surveying and Cost Consulting Services: Schedule of Services and Recommended Charges.

Elemental Cost Analysis, Format, Method of Measurement, Pricing, 3rd Edition, 2000.

Method of Measurement of Construction Works, 7th Edition, 2000.

Dell'Isola, Alphonse. *Value Engineering: Practical Applications... for Design, Construction, Maintenance & Operations.* Kingston, MA: R.S. Means Co., Inc., 1998.

Derman, Asher, Ph.D. "Embodied Energy, Air Pollution, and Materials, Part 1." *AIA Environmental Guide.* Washington, D.C.: The American Institute of Architects Press, January 1993.

Foster, Norman *et al. Construction Estimates From Take-Off to Bid.* Third Edition. New York, NY: Hill, 1961.

Kirk, Stephen J. and Alphonse Dell'Isola. *Life Cycle Costing for Design Professionals.* Second Edition. New York, NY: McGraw-Hill, 1995.

REED Construction Data publishes a range statistics and economic information on the construction industry, as well as cost estimating tools and books.
www.canadata.com
www.rsmeans.com

Toronto Real Estate Board. *Schedule of Unit Costs.* Published annually. Toronto, Ont.

Appendix — Description of the Classes of Estimates used by PWGSC for Construction Costing of Building Projects

Class "D" Estimate

This estimate provides an indication of the total cost of the project, based on the user's functional requirements to the degree known at the time. It is based on historic cost data for similar work, suitably adjusted for such factors as: effect of inflation, location, risk, quality, size, and time. All related factors affecting cost are considered to the extent possible. Such an estimate is strictly an indication (rough order of magnitude) of the project total cost and completion date. This estimate is used to establish the *indicative* estimate required by Treasury Board for Preliminary Project Approval. Expected degree of accuracy: 20%.

Class "C" Estimate

This estimate is prepared at the end of the Design Concept stage and is based on updated user requirements, general description of the end built works, preliminary site information and existing conditions, and production. It takes into consideration construction experience and market conditions as well as basic implementation logistics. The estimate includes costs for design, documentation, and construction supervision. Expected degree of accuracy: 15%.

Class "B" Estimate

This estimate is prepared at the end of the Preliminary Design stage and is based upon data (on cost, time, and construction) of a level of precision as is typically available when the design of the major systems and sub-systems of the facility (including outline specifications and preliminary drawings and models), as well as when the results of all site or installation investigations are completed. This estimate also makes allowance for all costs resulting from the anticipated schedule, expected market conditions, and suitable level of contingencies. This estimate is used to establish the *substantive* estimate required by Treasury Board for Effective Project Approval. Expected degree of accuracy: 10%.

Class "A" Estimate

This estimate is based on the B estimate which has been updated concurrently with the development of Construction Documents and is submitted as a final pre-tender estimate. It requires that project systems be designed and specified to near completion, and is based on a realistic construction schedule as well as accurate labour and material costs. This is the final estimate before tender call or construction start. Typically, the total forecast is presented in elemental format and includes all actual associated fees and costs. Expected degree of accuracy: 5%.

(Source: Public Works and Government Services Canada)



2.3 Management of the Project

2.3.4 Pre-design

2.3.4

Canadian Handbook of Practice for Architects

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Pre-design

Introduction

By definition, **pre-design** occurs before the commencement of schematic design. Some architects are qualified to provide a range of pre-design services, such as:

- feasibility studies;
- site analysis and selection;
- building surveys, audits, and measured drawings;
- functional programs;
- master plans;
- organizational planning and strategic plans;
- financial and business plans;
- re-zoning;
- organizing an architectural competition;
- arranging for proposal calls.

Some of these services may lead to actual design commissions and building projects; others may not. Many pre-design services are outlined in Schedule A, which is one of the optional schedules that can be affixed to in the *Canadian Standard Form of Contract Agreement Between Client and Architect: RAIC Document Six*. The fees for pre-design services should be determined or negotiated separately from the traditional five phases for a building project.

Refer also to Chapter 2.1.10, *Architectural Services and Fees*.

The Consultant Team

Most pre-design services require special expertise. The challenges for architects in assembling a consultant team include:

- identifying the specialized knowledge and advice required;
- being aware of the full range of their own capabilities as generalists and problem-solvers;
- staying up-to-date in specialized fields.

Most architects are able to:

- provide the broad, detached overview that pre-design involves;
- understand the working environments and requirements of their clients.

On the other hand, providing pre-design services does require some specialization and currency in fields which are different from, but related to, traditional architectural practice. Certain aspects of pre-design may require the skills of specialist consultants. As a result of their training and experience, architects often act as facilitators or leaders of multi-disciplinary teams of consultants providing pre-design services.

Each architectural practice must decide whether it can afford to employ non-architectural expertise in-house, or should offer these services by assembling teams of consultants. Successful pre-design work depends on the selection and management of an appropriate team. In addition to the design professionals, such as engineers and landscape architects, many architects may need to engage outside consultants for some of the following services:

- functional programming;
- urban planning;
- environmental planning;
- geotechnical surveys and analysis;
- historical research;
- space planning;
- cost estimating or quantity surveying;
- real estate appraisal;
- accounting and financial analysis;
- information technology;
- market research;
- management consulting.

Refer also to Chapter 1.2.3, *Consultants*, for a complete list of specialist consultants.

Feasibility Studies and Business Cases

Some architects conduct feasibility studies and business cases as part of their services.

A Business Case is a document that generates the support and participation needed to turn an idea into reality. It should explains what the idea, problem, or opportunity is about; how and who it will impact; what others are doing; and analyze alternatives including the associated impacts, risks and cost/benefit of each alternative; and make recommendations.

The complexity of a business case and time taken to prepare it depends on the nature of the business initiative. The business initiative could, in turn, spawn multiple projects (such as a feasibility study, request for proposals, development and construction, implementation or transition) and each one may warrant their own separate study for funding or resource allocation.

Feasibility studies often incorporate the following information and analysis:

- functional programs, including general space requirements and functional relationships, to identify the scope of a project;
- studies of regulations to determine code and zoning constraints, urban design objectives, and community issues related to a project;
- identification and evaluation of potential sites;
- environmental impact analysis;
- market studies, which forecast demand and also real estate market value of a completed project;
- demographic studies predicting demand and, possibly, preferences and lifestyle trends;
- financial studies identifying:
  - capital, operating, and maintenance costs;
  - sources of revenues, including funds to offset capital and operating costs;
- valuation of land and sites;
- evaluations of existing facilities, including:
  - building envelope;
  - mechanical, electrical, and structural systems;
  - functional adaptability;
  - code compliance;
- life cycle cost projections;
- studies to determine the compatibility of a functional program for a new facility with an existing or renovated building;
- exploration of alternatives, such as the "best" fit of a functional program with several potential sites;
- schedules for:
  - project development;
  - cash flow planning;
  - project phasing or decanting strategies (that is, maintaining a client's operations during changes to an existing facility).

Designing a project is often a very open and consultative process, involving the architect, the client, and various stakeholders.

Architects are required to provide pre-design services and undertake feasibility studies to deal with an increasingly complex regulatory environment. Therefore, feasibility studies may examine:

- official plans and community plans;
- zoning and land-use controls;
- designated activity districts within cities;
- transportation issues;
- heritage districts;
- community organizations and concerns;
- civic design panels;
- building codes;
- environmental issues.

For government clients, feasibility studies could include an exploration of economic partnerships with the private sector, because depending on economic or political conditions, governments may choose to reduce capital spending on public projects.

Clients are increasingly interested in renewing buildings and infrastructures rather than replacing them. In such cases, a feasibility study might assess:

- existing structures and their adaptive re-use for the future;
- the value of heritage conservation.

Functional Programming

A problem well-stated is already half-solved.

This quotation summarizes what an architect does in developing a functional program. Functional programs are also called design briefs, facilities programs, architectural programs, owner's statement of requirements, space needs analyses or, simply, programs.

Time and money can be wasted because of lack of appropriate direction from a client. A functional program, which is developed jointly by the architect and the client, clearly defines the problem. Good functional programs result in better and more effective design solutions.

A functional program describes the requirements which a building must satisfy in order to support and enhance human activities. The programming process seeks to answer the following questions:

- What is the nature and scope of the project parameters, needs and opportunities?
- What information is required to develop a proper architectural response?
- How much and what type of space is needed?
- What space will be needed in the next five to ten years or longer to continue to operate efficiently?

In preparing a functional program, the architect's main task is to examine the client's world in detail so as to define the client's needs and objectives. These requirements will establish criteria for evaluating potential design solutions or other strategic alternatives. The architect must understand:

- the impacts of a building's occupants and processes on the built environment;
- the social impacts of its program on the community;
- the planning impacts of its functions on the local infrastructure.

To prepare a functional program in consultation with the client, architects will usually identify, research, and observe:

- the users of the proposed building and their work activities, including:
  - function-by-function, room-by-room, or department-by-department activity plans;
  - staffing plans;
  - storage requirements;
- previous precedents and similar building types;
- the volume of activity planned for specific facility components, such as:
  - throughput (amount of material put through a manufacturing process);
  - flow patterns and human activities

With this information, the architect can then develop approximate floor areas and technical requirements for the proposed facility, including:

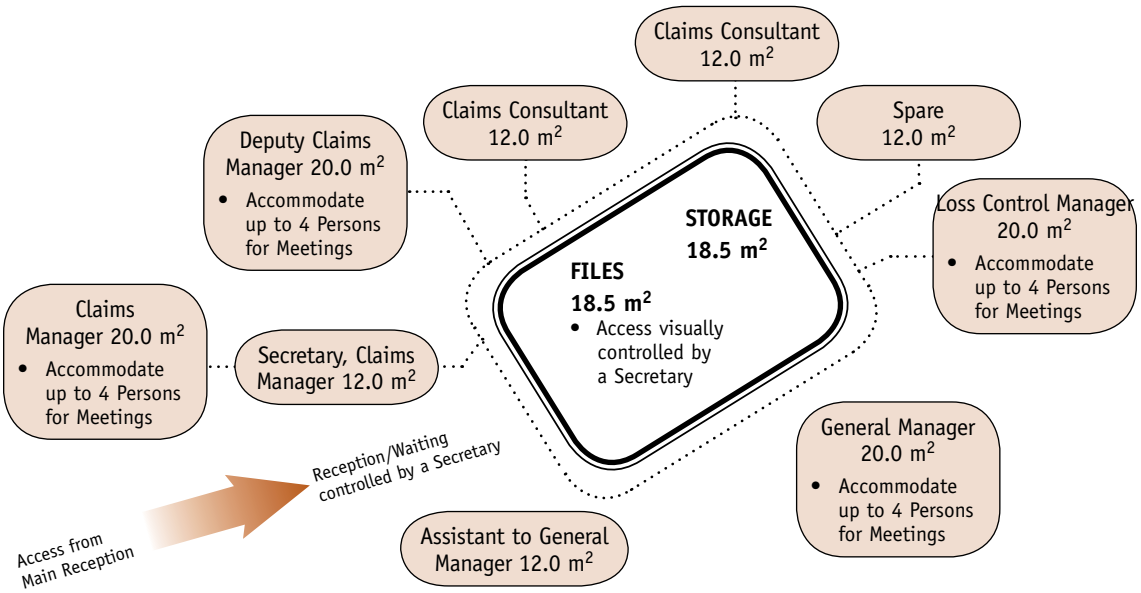
- details of the space or of the workstation;
- special furniture configurations;
- environmental criteria;
- security requirements.

The architect's services could also include advice to the client on alternatives, such as the architectural and financial implications of various building and siting options. Functional programs for buildings are future-oriented — alternative scenarios may be based on high-, medium-, and low-growth projections, or on fast, medium or slow roll-outs of anticipated events. The architect should assist the client in assessing the advantages or benefits — and the disadvantages or costs — of each alternative.

The final functional program is a report which can include some of the following information:

- the client's philosophy, values, goals, and desired "image";
- site requirements, such as parking, circulation, orientation;
- explicit space requirements for the future building, including:
  - definition of the activities which will take place in each space in the building;
  - the functional relationships of the spaces;
  - "bubble" diagrams (see Illustration 1) and flow diagrams;
  - the size of each of the spaces;
  - special technical requirements of each of the spaces, the building systems and equipment;
- financial requirements and a preliminary budget;
- scheduling and time frame for the project;
- other requirements including:
  - regulatory issues such as zoning and

Illustration 1: Typical Bubble Diagram (Spatial Relationship Diagram)



All areas are expressed in square metres

building code requirements;
- other requirements from Authorities Having Jurisdiction;
- community goals and concerns;
- ecological and environmental concerns;

- a recommended construction project delivery method.

Illustration 2 shows a method of presenting some of the space requirements in a functional program.

Functional programs are often prepared as part of a *design brief* — information to be provided to another architect commissioned to design the building. Sometimes, particularly for simple or small projects, the functional program is prepared as part of the schematic design phase of a project.

Architectural fees for functional programming are determined separately and are not part of "basic services."

Programming Skills

Programming requires specific skills. The programmer must develop the ability to understand a client's philosophy, values, and management style in areas such as:

- organizational behaviour;
- decision-making;
- success measurement;
- future objectives;
- social responsibility.

To develop this ability, the architect draws on knowledge and information borrowed from:

- the social sciences;
- management sciences;
- operations research;
- industrial engineering.

In addition to architectural ability, the architect may require such skills as management consulting and development economics to undertake functional programs. And along with research expertise, the architect needs good interpersonal and facilitating skills.

The architect often uses the following techniques:

- research;
- observation (of the client's existing site or workplace);
- interviews and direct consultation with end users of the facility;
- public consultation;

- facilitation of focus groups;
- questionnaires and surveys.

Sometimes, stakeholders in a future building project may have conflicting viewpoints. In these cases, the architect must clarify the underlying issues and then find the best solution incorporating common interests and synergies amongst the differing groups. Typical sources of conflict include:

- competing needs may exist within the client organization (for example, end users — such as tenants, teachers or medical staff — may have very different priorities and needs compared to those of landlords, school boards or regional health authorities);
- the involvement of more than one organization;
- different members within the organization may have different visions for the project.

Data management ties together all the information in a functional program. The architect or the programmer must know how to systematically store and retrieve an enormous amount of detailed information. The architect must also present this data to the client clearly so as to enable the client to make effective decisions.

Quantitative Factors

One purpose of most functional programs is to determine the optimum size of a building.

Illustration 2: Unit Space Data

Activity

This area will serve as a utilitarian storage of records from all administrative departments, including all documents which will be archived and not frequently used. This area may be located below grade.

Description of Furnishings and Special Requirements

Note 1. This area requires extensive shelving for non-standard documents and materials, work tables, a reference desk and card catalogues, and 200m of lateral filing cabinets.

Note 2. Environment shall have Temperature set point:
Summer 20 deg C
Winter 20 deg C
Relative Humidity set point:
Summer 50% RH
Winter 50% RH
max. fluctuation ± 3%

Note 3. Floor construction must support adequate loads imposed by lateral filing cabinets.

Room Name: Central Storage Records

Floor Area	430 m^2	
Critical Dimensions	Ceiling height: Length: Width:	4 m — —
Access	Freight and public elevator	
Daylight	No daylight required or desired	
Users	Staff Visitors Others	Yes No No
Time in Use	Office hours Other hours Special	Yes Yes Yes
Furnishings		Note 1
Security	Basic level of protection	
Finishes	durable resilient flooring/ painted gypsum board/ accessible acoustic tile	
Electrical	110v AC utility outlets	
Lighting	General level Task level UV screened	Yes Yes No
HVAC Sytems		Note 2
Plumbing		not required
Fire Suppression	Standard requirements	
Communications	Telephone, data, and intercom	
Floor Loading		Note 3

The amount of space required is ascertained from first principles of architectural design, such as:

- the number of people or pieces of equipment that will occupy the spaces;
- the nature of the activity in the space.

Architects need to be familiar with current reference material and standards which relate human activities or technical processes to the amount of space required to support them. The best standards are developed from large amounts of data.

Refer to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*, for a discussion of standards.

In pre-design work, an understanding of net and gross floor areas is essential for determining the probable size of a building. Architects working for the commercial sector need to be familiar with the floor area measurements used for leasing purposes. The Building Owners and Managers Association (BOMA) publishes the *Standard Method for Measuring Floor Areas in Office Buildings*, a standard known as ANSI/ BOMA Z65.1-1996. Other agencies at the federal and provincial level publish floor area standards for other building types.

Site Evaluation and Analysis

Site evaluation is a pre-design service. It includes evaluation of existing or potential sites in relation to the building program, budget, and construction schedule. Normally one site is then recommended.

Site analysis of a single site in the pre-design phase is usually a separate service. In certain circumstances, site analysis may be undertaken as part of the schematic design phase of a project and the fee should be adjusted accordingly.

Data Collection

To analyze the site, the architect requires the following information:

- existing conditions which have an impact on the design:
  - climate, including prevailing winds, solar orientation, etc.;
  - topography, including site contours, drainage, water courses, visual characteristics, physical features, vegetation, water bodies, etc.;
  - geotechnical or soil information;
  - environmental hazards;
  - immediate surroundings, including neighbouring structures, shading and solar access, noise, views, and vistas;
- property description:
  - legal description, including boundary survey, easements, rights-of-way, etc.;
  - vehicular and pedestrian access;
  - utilities and services available to the site.

Zoning and Other Regulations

It is important to identify the zoning or land use regulations which apply to the site, including:

- permitted uses;
- minimum area;
- height restrictions;
- setbacks;
- lot coverage:
  - floor area ratio;
  - percentage of coverage;
- open space requirements;
- parking requirements;
- other requirements.

The architect also needs to determine what other regulatory requirements apply to the site and the respective Authority Having Jurisdiction. Refer also to Chapter 1.2.4, *Building Regulations and Authorities Having Jurisdiction*.

After site analysis has been completed, it may be necessary to prepare presentation material to assist in the formal procedures for applications to the Authorities Having Jurisdiction. The architect may also be expected to make presentations to municipal committees or at public meetings during the pre-design stage of a project.

Refer to "Site Evaluation Checklist" at the end of this chapter for a complete list of factors to consider when evaluating a site.

Master Planning

Master plans define long-term development strategies for specific sites, campuses or communities, including considerations related to current and future infrastructure, site development, site circulation, and spatial relationships. A master plan, may be required following completion of a functional program and establishes the process for the program's staged implementation over time.

Organizational Planning

Organizational change frequently generates the need for new buildings or alterations to existing buildings. Conversely, executives and managers often use the decision to plan and renovate or construct as a catalyst for organizational or administrative change. The architect is likely to become involved in this process and should have a basic knowledge of the culture of organizations and business administration. Information on organizations and management is available through management training courses and in most libraries.

Financial Planning

Financial issues are usually first addressed at the pre-design phase of a project. Data and information about the proposed building at this stage are general in nature; therefore, cost planning will likewise be very general. The programmer must be familiar with the cost information available for early financial planning, for example:

- hospitals use unit-of-service measures to identify "ballpark" costs of proposed development, such as:
  - cost, expressed in $ per bed;
  - the number of beds determined by populations in the hospital catchment area;
- some educational institutions use formulae based on the number of full-time-equivalent students to determine:
  - the amount of space at an early stage;
  - the capital cost of projects;
- developers have rules of thumb for determining the likely capital costs of housing, office buildings or shopping centres.

Financial plans are typically presented as a "pro forma" which may include:

- hard development costs (construction and land costs);
- soft development costs (such as professional fees, realtor fees);
- financing costs;
- market revenue analysis;
- escalation;
- rates of return on investment.

The completed financial plan should identify "how much building must be built" (scope of the project) and should establish a preliminary financial analysis indicating capital costs on a unit area basis. One purpose of a financial plan is to provide information used to prepare a project budget and construction budget. Refer also to Chapter 2.3.3, *Cost Planning and Control*.

Definitions

Business Case: A document developed to establish the merits and desirability of the project and justification for further project definition and the commitment of resources. Information included in a business case includes the background of the project, the expected business benefits, the options considered (with reasons for rejecting or carrying forward each option), the expected costs of the project, a gap analysis or the variance between business requirements and current capabilities, and the expected risks. Consideration should also be given to the option of doing nothing including the costs and risks of inactivity.

Feasibility Study: A report which outlines the research and subsequent analysis to determine the viability and practicability of a project. A feasibility study analyzes economic, financial, market, regulatory, and technical issues.

Functional Program: A written statement which describes various criteria and data for a building project, including design objectives, site requirements and constraints, spatial requirements and relationships, building systems and equipment, and future expandibility.

Pre-design Services: The architectural services provided prior to the schematic design phase which assist the client in establishing a functional program as well as the project scope, including a financial and scheduling plan.

References

Brauer, R.L. *Facilities Planning*. New York, NY: Amacon, 1992.

France, Kenneth and Michelle Kish.

Helping Skills for Human Service Workers: Building Relationships and Encouraging Productive Change. Charles C. Thomas, 2005.

Supportive Interviewing in Human Service Organizations. Springfield, IL: Charles C. Thomas, 1995.

Hershberger, Robert. *Architectural Programming and Predesign Manager*. New York, NY: The McGraw-Hill Companies, 1999.

Palmer, Mickey A. *The Architect's Guide to Facility Programming*. New York, NY: The American Institute of Architects and Architectural Record Books, 1981.

Peña, William M; Steven A. Parshall; and Kevin A. Kelly. *Problem Seeking: An Architectural Programming Primer*. John Wiley & Sons. 2001

R.S. Means Co., Inc. *Yardsticks for Costing*. Published annually. Canadian Construction Cost Data. Published annually. R.S. Means Co., Inc.

Appendix A - Green Building Rating Systems

Introduction

Designing, constructing and operating environmentally friendly buildings can be complex, especially when it comes to materials selection. All architects would like simple measures or rules of thumb that would make the selection process easy, but such simple measure do not exist. The reality is that designers and specifiers are constantly forced into a balancing act, trading off a good effect here with a not-so-desirable outcome there. Fortunately, there are a variety tools that can help. This Appendix presents a simple system for classifying sustainable, or 'green', building tools and describes how these tools interrelate, and where they fit in the green design process.

A Tool Classification System

This simple tool classification system helps organize the most commonly used green building tools in terms of their purpose and application in various phases of project delivery. The system suggests three main levels of tools, labeled simply as Level 1, 2, and 3 tools.

Level 1 tools focus on individual products or simple assemblies (such as floor coverings or window assemblies) and are used to make comparisons in terms of environmental and/or economic criteria. Level 1 tools are probably the most common tools. *BEES* and *GreenSpec Directory* are especially relevant for architects:

- *BEES* is a Life Cycle Assessment (LCA) based software tool developed by the U.S. National Institute of Standards and Technology, and is designed to make product-to-product comparisons based on LCA and Life Cycle Costing (LCC) data. It uses a weighting system to combine disparate environmental measures into one score that can be charted against cost. (*www.bfrl.nist.gov/oae/software/bees.html*)

- *GreenSpec Directory* is a guide to "green" building products developed by Building Green (the publishers of Environmental Building News), and through an online web site subscription. The Directory provides detailed product listings for more than 1,800 products in 250 categories, organized according to the CSI *MasterFormat™* system, and helps users understand the environmental merits of individual products based on a set of criteria developed by the publishers. GreenSpec also provides guideline specifications for each product category, indicating the benefits, drawbacks, environmental considerations, and generally what to look for in a green product within a given category. *www.BuildingGreen.com*

Labeling systems like the Environmental Choice program, operated by Terra Choice, and various forest certification systems are also Level 1 tools. The caution is that many labeling programs focus on single attributes, or performance measures (such as energy use or recycled content, for example), and therefore it may be misleading when they convey a 'green' label. The product in question may indeed be excellent in terms of the criteria selected for the evaluation, but that does not necessarily mean it would score well in a full Life Cycle Assessment, or in a system that takes more attributes into account. *www.EnvironmentalChoice.com*

Level 2 tools focus on the entire building, or complete assemblies, providing support for decision-making in specific areas of concern such as life cycle costs, operating energy, or life cycle environmental effects. Theses tools are data-oriented and objective, and can be applied from the pre-design through to detailed design and construction documentation stages of a project. Operating energy simulators (e.g., EE4 and Hot2000), day-lighting analysis tools such as Radiance, and the RETscreen renewable energy feasibility tool are in this category along with life cycle costing.

www.radsite.lbl.gov/radiance/HOME.html
www.retscreen.net

Athena's Environmental Impact Estimator is particularly relevant here because it is the only Level 2 tool in North America that assists with material selection in the context of life cycle assessment of an entire building. Rather than dealing with individual products, it focuses on the entire building or complete building assemblies and therefore captures the implications of such a system comprised of several products within a building's structure and envelope. *www.athenaSMI.ca*

The Estimator and *BEES* are complementary, with the Estimator more appropriately used at the conceptual and schematic design stage, and *BEES* during design development and construction documentation stages.

Level 3 tools are whole building assessment frameworks or systems that encompass a broader range of environmental, economic and social concerns or sustainability issues. Level 3 tools use a mix of objective and subjective inputs, leaning on Level 2 tools for much of the objective data — energy simulation results, for example. All use subjective scoring or weighting systems to distill the information and provide overall measures, and all can be used to inform or guide the design process.

LEED™ and Green Globes, a derivative of BREEAM Green Leaf, are currently the best-known Level 3 tools in Canada. These Level 3 tools may be used for new projects, existing buildings, and for major renovations or retrofits. Some of these tools require external auditors, and most yield certificates or labels indicating a building's performance. They can be used for a wide range of building types, from residential to commercial, institutional and light industrial.
www.cagbc.ca and *www2.energyefficiency.org*

Other Tools, Systems and Sources

The tools mentioned above are only representative and certainly do not exhaust the list for each category. For example, there are other sources of information on products, and there are excellent web sites that provide design guidance as well as specific technical information. There are also other whole building assessment systems used in the U. S. and elsewhere.

It is important to understand clearly their important distinctions. Does a tool work at the level of whole buildings or is it focused more on individual products or components? Does it deal with a specific topic or concern, such as energy use, or does it cover a broad spectrum of sustainability issues? Is the tool quantitative or does it include subjective or qualitative elements? Too often these distinctions are ignored and comparisons are made between tools that are intended for entirely different purposes. For example, *BEES* and the Athena EIE are complementary tools, intended to meet different needs at different stages of the project. They are not competitive tools requiring a choice of one over the other.

Other resources:
www.iiSBE.org
www.wbdg.org

Life Cycle Assessment (LCA)

LCA is a methodology for assessing the environmental performance of a product over its full life cycle, often referred to as cradle-to-grave or cradle-to-cradle analysis. Environmental performance is generally measured in terms of a wide range of potential effects, such as fossil fuel depletion, global warming, or ozone depletion. All are measures of indicators of the environmental loadings that can result from the manufacture, use and disposal of a product. The indicators do not directly address the ultimate human or ecosystem health effects — a much more difficult and uncertain task — but they do provide good measures of environmental performance, given that reducing any of these effects is a step in the right direction.

In LCA, the effects associated with making, transporting, using, and disposing of products are referred to as '*embodied effects*', where the word "*embodied*" refers to attribution or allocation in an accounting sense as opposed to true physical embodiment. In the design and construction sector, the tendency is to refer primarily to 'embodied energy', but all of the extractions from and releases to nature are embodied effects, and there are also embodied effects associated with the production and transportation of energy itself (known as pre-combustion effects).

Although the energy required to operate a building over its life greatly overshadows the energy attributed to the products used in its construction, other embodied effects such as toxic releases to water, are almost entirely a function of resource extraction, manufacturing and transportation activities. The point is to beware of the common tendency to focus only on embodied energy. The essence of LCA is to cast the net wide and capture all of the relevant effects associated with a product or process over its full life cycle, including the production and use of other products required for operations, cleaning or maintenance.

LCA is not the same as life cycle costing (LCC). The two methodologies are complementary, but LCC focuses on the dollar costs of constructing, operating and maintaining a structure over its life cycle, whereas LCA focuses on environmental performance. Performance is measured in the units appropriate to each emission type or effect category. For example, global warming gases are characterized in terms of their heat trapping effects compared to the effects of CO2, and global warming potential is measured in equivalent tonnes of CO2.

Site Evaluation Checklist

This is a checklist of the factors that may be involved in evaluating a site. Although lengthy, this list is not all-inclusive; new factors are added from time to time. Information is usually collected only for those items that are pertinent to the project.

PHYSICAL FACTORS

Climate

A. Prevailing winds
   1. Direction
   2. Maximum, minimum, and average velocities
   3. Special forces (e.g., tornadoes, hurricanes)

B. Solar orientation
   1. Sun angles
   2. Days of sunlight
   3. Cloud cover
   4. Shading of (or from) adjacent structures, natural features, and vegetation

C. Temperature
   1. Ranges of variation
   2. Maximums and minimums

D. Humidity
   1. Ranges of variation
   2. Maximums and minimums

E. Precipitation
   1. Peak period totals
   2. Annual and seasonal totals

Topography

A. Legal property description, including limits of property, easement, rights of way, and north indication

B. Topography maps and aerial photos
   1. Contours and spot elevations
   2. Slopes: percentage, aspect, orientation
   3. Escarpment
   4. Erosion channels
   5. Extent, location, and general configuration of rocks, ledges, outcrops, ridges, drainage lines, and other unique features
   6. Visual characteristics
   7. Potential problem areas during construction: siltation, erosion, etc.

C. Analysis of physical features, including major focal and vantage points and their relationships within, into, and out from the site

D. Existing access and circulation
   1. Vehicular
   2. Pedestrian

E. Vegetation

F. Existing water bodies
   1. Location, size, depth, direction of flow
   2. Water quality: clean, polluted, anaerobic conditions, etc.
   3. Use: seasonal, year-round
   4. Wetlands: ecological features
   5. Variations: expected water levels, tides, wave action
   6. Coastal features

G. Drainage canals: rivers, streams, marshes, lakes, ponds, etc.
   1. Natural and built
   2. Alignments and gradients
   3. Pattern and direction

H. Existing waterway easements
   1. Surface
   2. Sub-surface

I. Surface drainage
   1. Patterns on and off the site (location of streams and washes)
   2. Proximity to floodplains
      a. Maximum flood level
      b. Frequently flooded areas
   3. Local watershed areas, amount of runoff collected, and location of outfalls
   4. Swampy and concave areas of land without positive drainage and other obstacles that may interrupt or obstruct natural surface drainage
   5. Potential areas for impoundments, detention/retention ponds

J. Unique site features

Geotechnical/Soils

A. Basic surface soil type: sand, clay, silt, rock, shale, gravel, loam, limestone, etc.

B. Rock and soil type: character/formation and origin
   1. Geologic formation process and parent material
   2. Inclination
   3. Bearing capacity

C. Bedrock
   1. Depth to bedrock
   2. Bedrock classification

D. Seismic conditions

E. Environmental hazards

Utilities

A. Potable water
B. Electricity
C. Gas
D. Telephone
E. Cable television
F. Sanitary sewer service
G. Storm drainage (surface, sub-surface)
H. Fire protection

Immediate Surroundings

A. Neighbourhood structures: buildings, satellite dishes, etc.
B. Shading and solar access
C. Noise from streets, emergency services, aircraft, etc.
D. Odours
E. Views and vistas

General Services

A. Fire and police protection
B. Trash/refuse removal services
C. Snow removal, including on-site storage

CULTURAL FACTORS

Site History

A. Former site uses
   1. Hazardous dumping
   2. Landfill
   3. Old foundations
   4. Archaeological grounds

B. History of existing structures
   1. Historic worth
   2. Affiliations
   3. Outline
   4. Location
   5. Floor elevations
   6. Type
   7. Condition
   8. Use or service

Land Use, Ownership, and Control

A. Present zoning of site and adjacent property

B. Adjacent (surrounding) land uses
   1. Present
   2. Projected
   3. Probable effects on the development of this site

C. Type of land ownership

D. Function and pattern of land use: public domain, farm type, grazing, urbanized
   1. Present
   2. Former

E. Location, type, and size of pertinent community services
   1. Schools and churches
   2. Shopping centres
   3. Parks
   4. Municipal services
   5. Recreational facilities
   6. Bank
   7. Food services
   8. Health services
   9. Access to highways, public transportation

Economic Value

A. Political jurisdictions and land costs

B. Accepted "territories"

C. Future potential

D. Size of surrounding lots and approximate price ranges

REGULATORY FACTORS

Zoning Codes

A. Permitted Uses
   1. By variance
   2. By special use permits
   3. Accessory structures

B. Minimum site area requirements

C. Building height limits

D. Yard (setback) requirements

E. Lot coverage
   1. Floor area ratio (FAR)
   2. Percentage of coverage
   3. Open space requirements

F. Off-street parking requirements

G. Landscaping requirements

H. Sign requirements

Sub-division, Site Plan Review, and Other Local Requirements

A. Lot requirement
   1. Size
   2. Configuration
   3. Setbacks and coverage

B. Street requirements
   1. Widths
   2. Geometry: grades, curves
   3. Curbs and curb cuts
   4. Road construction standards
   5. Placement of utilities
   6. Dead-end streets
   7. Intersection geometry
   8. Sidewalks
   9. Names

C. Drainage requirements
   1. Removal of spring and surface water
   2. Stream courses
   3. Land subject to flooding
   4. Detention/retention ponds

D. Parks
   1. Open space requirements
   2. Park and playground requirements
   3. Screening from adjacent uses

Environmental Regulations

A. Water, sewer, recycling, solid waste disposal

B. Clean air requirements

C. Soil conservation

D. Protected areas, wetlands, floodplains, coastal zones, wild and scenic areas

E. Fish and wildlife protection

F. Protection of archaeological resources

Other Codes and Requirements

A. Historic preservation and landmarks

B. Architectural (design) controls

C. Special districts

D. Miscellaneous, e.g., mobile homes, billboards, noise

E. Site-related items in building codes
   1. Building separation
   2. Parking and access for persons with disabilities
   3. Service and emergency vehicle access and parking

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Checklists for an Integrated Design Process for Retrofitting Buildings

Step 1: **Needs Assessment**

a) Assemble the Design Team
   - include engineers experienced and interested in energy efficient buildings and energy simulations (consider defining the energy performance expectations for the consultants and clearly articulate these requirements contractually in an architect/consultant agreement)
   - include a lighting designer or a daylighting specialist
   - consider a third party commissioning consultant depending on the size and complexity of project
   - include the building maintenance personnel responsible for the building(s)

b) Confirm client and user objectives

c) Establish long-term financial goals (such as 10 year combined operating + capital target)

d) Establish performance targets and strategies to meet client and user objectives

e) Identify and address contradictions between objectives, financial goals and performance targets

f) Develop or assess functional program (including objectives, performance targets and financial goals)
   - see *Functional Program Checklist*

Step 2: **Existing Building Assessment**

a) Conduct an Audit of the Existing Building (This audit should be conducted with all the relevant consultants on the site simultaneously. The architect should take the lead and ensure that all aspects of the building systems are reviewed. Visual review should be thorough, invasive review in selected areas should also be completed if appropriate.)
   - Client to provide Base Drawings for Architectural, Mechanical, Electrical and Structural systems if existing
   - Client to provide Energy Data for previous year of use: fuel, electrical, water (utility bills, etc.)
   - see *Building Audit Checklist*

b) Hold a Design Workshop
   - see *Design Workshop Checklist*

Step 3: **Proposed Building Retrofit Plans**

a) Develop Concept Design
   - see *Performance Design Concepts Checklist*

b) Develop Preliminary Lighting and Power System Upgrades
   - see *Upgrades to Existing Lighting and Power Systems*

c) Develop Preliminary Heating, Cooling and Ventilation System Upgrades
   - see *Upgrades to Existing HVAC System*

d) Select Finish Materials and Systems
   - see *Materials Selection Checklist*

Step 4: **Assessing Alternatives and Interactions**

a) Compare individual system designs to project objectives and goals

b) Assess whole building performance

c) Revise designs and re-assess

d) Compare to 10 year operating + capital targets

Step 5: **Final Retrofit Plan**

a) Complete Site and Building Design and Documentation
   - see *Design and Documentation Checklist*

b) Develop Quality Assurance Strategies for Construction
   - see *Construction Quality Assurance Strategies Checklist*

c) Develop Quality Assurance Strategies for Operation
   - see Operation Quality Assurance Strategies Checklist

Step 6: **Performance Assurance & Monitoring**

a) Owner / Operator to provide reports on operations, maintenance, & utility bills

b) Analyze building performance, compare to performance targets Performance failure troubleshooting

Checklist For Retrofitting Buildings

1: Functional Program Checklist

- ❑ Determine if the proposed space requirements can be satisfied by re-organisation instead of renovation
- ❑ Develop facility functional program to respond to building structural grid to reduce extent of demolition in the proposed renovation. Assess the capacity of the functional program to support mixed uses
- ❑ Verify expected occupancy schedules and determine the extent to which they are subject to change over time. (Buildings with a high percentage of off-hours operations, with the building only partially occupied will benefit from highly flexible HVAC systems)
- ❑ Determine an acceptable comfort range based on the building occupancy and facility functional program. (Dehumidication and humidification strategies can be very energy intensive)
- ❑ Review the functional program requirements and determine the relative complexity of building performance needed. A building utilized 24 hours per day 7 days per week (24/7) has obviously different implications to a building utilized 10/5
- ❑ Review plug load assumptions. (Plug loads are often overestimated: verify usage of equipment not just electrical capacity as noted on the equipment)
- ❑ Determine lighting levels for all programmed areas. Consider reducing general ambient lighting levels and utilizing task ambient lighting to achieve minimum acceptable levels
- ❑ Review budget and pay-back requirements for compatibility with performance goals
- ❑ Prepare a Functional Program and Performance Goals Report

2: Building Audit Checklist

- ❑ **Structural Review**
  Outline structural system, load capacity, grid horizontal and vertical dimensions Indicate thermal mass properties (if any) Outline current code requirements for the structural system, potential upgrades required Outline generic building horizontal and vertical modules based on the structural grid Review: Does the design of this system complement or compromise any other system?
- ❑ **Building Enclosure Review**
  Review and document existing site conditions Document the type, condition and thermal properties of building enclosure systems: floors, walls, windows, roofs Document the type and condition of building vertical circulation systems Document the current envelope and an estimated future replacement schedule Document the current building code requirements and upgrades required (if any) Review existing building exterior finishes for type, condition and replacement schedule
- ❑ **Mechanical Review**
- ❑ **Lighting Review**
- ❑ **Review of Interior Finishes and Equipment**
- ❑ **Building Energy Audit**
- ❑ **Code Review**

3: Design Workshop Checklist

- ❑ Indicate energy benchmarks for existing building based on building typology and age of construction
- ❑ Determine the largest energy cost component of the existing building (lighting, cooling, heating, ventilation) from building historical data on energy use
- ❑ Develop a reference schematic design for the building that fulfills minimum code, functional, market and reference requirements
- ❑ Undertake an energy simulation and cost analysis of the reference design
- ❑ Hold a one or two day Design Workshop with the Design Team and invited experts to review the Reference Design and to discuss performance design concepts.
- ❑ Establish performance goals, targets and strategies, include:
  - Energy usage
  - Water Usage
  - Return on Investment (ROI) timelines
  - Mechanical / Natural Ventilation Strategies
- ❑ Outline potential enclosure enhancements appropriate for climate zone
- ❑ Set preliminary targets for envelope performance
- ❑ Decide on at least one design option for further development
- ❑ After the Design Workshop, undertake energy simulations and cost analysis of high performance option(s) and revise performance targets and strategies if necessary and add new talent to the design team as required
- ❑ Prepare a Design Workshop Report.

4: Performance Design Concept Checklist

SITE DATA

In a retrofit project, the building site, form and orientation are existing conditions to consider and exploit. Some site features can ultimately affect the building energy usage and occupancy comfort levels as well as contribute towards improved indoor air quality.

- ❑ Does the existing building orientation have the potential to facilitate passive solar energy collection and storage?
- ❑ Collect information on local temperature means and extremes. (A diurnal temperature swing of 6-7 degrees C (20 degrees F) indicates that thermal mass storage or night ventilation could be an effective strategy)
- ❑ Collect information on available solar radiation
- ❑ Collect information on humidity. (Based on stated design criteria, an estimate of the number of days that would require humidification / dehumidication can be calculated)
- ❑ Collect information on prevailing wind direction and velocities. (Wind patterns inform the development of natural ventilation strategies)
- ❑ Are there renewable resources available for use in the building retrofit? (wind, solar, geothermal)
- ❑ Determine if there are any local utility, municipal, provincial or federal rebates and/or incentives for the integration of passive or active renewable resources or improved energy efficiency.

SITE ANALYSIS

- ❑ Consider the impact of topography. (If the building to be retrofit is located in an area with hills and valleys, slope and aspect, this topography can contribute to energy performance by draining cool air at night, contributing to lower temperatures)
- ❑ Consider the impact of vegetation. Increasing vegetation/trees around buildings can reduce exposure to sunlight (This can reduce temperatures by as much as 9 degrees C (15 degrees F))
- ❑ Develop landscape plans to provide windbreaks, shading, and minimize water demand
- ❑ Consider the extent to which the ground can act as a heat sink, based on the elevation of the water table relative to the frost line, and soil structure
- ❑ Review site context to determine if there established neighbourhood ecological patterns that could be enhanced, such as water treatment and drainage patterns, green spaces, pedestrian and transportation networks
- ❑ Review location and current codes to determine if the building will require a seismic upgrade
- ❑ If the functional program or retrofit results in an increased demand for parking, review opportunities for utilizing adjacent areas in lieu of increasing on site parking
- ❑ Consider measures to minimize construction damage to surface ecology.
- ❑ Consider measures to minimize impacts on subsurface ecology and aquifers.
- ❑ Summarize site development issues in a Draft Site Impact Plan

BUILDING RETROFIT CONCEPTS

- ❑ Develop concept plan to optimize functionality and minimize area and volume
- ❑ Organize configuration and floor plate depth to balance daylighting and thermal performance. If there is a large floorplate, can effective daylighting and ventilation strategies be created through the addition of new openings, an atrium, or skylights
- ❑ List of all the opportunities to reduce energy usage in the building
- ❑ If perimeter heating is utilized, is it either desirable or possible to enhance the building enclosure thermal properties (walls and windows) to eliminate the need for the perimeter heating?
- ❑ Consider ways to integrate the potential for future photovoltaic as an energy source into the redesign of the building electrical system
- ❑ Explore feasibility of mixed mode or elimination of mechanical ventilation and replacing it with natural ventilation if the functional program, form, and location permit
- ❑ If appropriate, consider utilizing an underfloor access distribution for considerable energy savings
- ❑ Consider using the structure as a finish material
- ❑ Does the existing building structure and building form allow for a green roof?
- ❑ Review the floor-to-floor height for flexibility to accommodate future uses
- ❑ Consider replacing fenestration on each building facade if the "Return on Investment" (ROI) warrants this approach to optimize solar heating/ cooling, daylighting benefits
- ❑ Optimize the daylighting and thermal performance of fenestration. Minimize locating fixed partitions along the perimeter that will affect daylight penetration into interior spaces
- ❑ Consider integrating exterior solar controls and interior light shelves into the retrofit concept if appropriate
- ❑ Optimize the envelope thermal performance using performance simulations
- ❑ Review: Does the design of this system complement or compromise any other system?
- ❑ Evaluate all energy and water saving systems as a team. Carry out whole building energy simulations
- ❑ Prepare the Concept Design Report.

5: Structural Design Checklist

- ❑ Identify structural load capacity to determine any restrictions in use
- ❑ Consider thermal storage options using structure
- ❑ Consider adequacy of column spacing and core position for future uses
- ❑ Consider floor to floors heights for ability to respond to changing HVAC delivery and cabling requirements
- ❑ Review: Does the structural system complement or compromise other building systems?

6: Enclosure Design Checklist

- ❑ Identify specific performance objectives
- ❑ Set preliminary targets for envelope performance
- ❑ Optimize daylighting and thermal performance of fenestration
- ❑ Optimize the envelope thermal performance using performance simulations
- ❑ Review: Does the design of this system complement or compromise any other system?

7: Upgrades to Existing Lighting and Power Systems

- ❑ Identify specific performance objectives
- ❑ Evaluate existing lighting design
- ❑ Develop preliminary lighting system design for retrofit
  - a. If existing design meets new needs:
    - i. Replace all incandescent with compact fluorescents(MR16 halogens currently have no drop-in replacements)
    - ii. Re-lamp and re-ballast to T8 and electronic ballasts. (Replacing fixtures will achieve best performance if moving from a T12 lamp to a T8)
  - b. If new lighting design required (note simply re-lamping and re-ballasting will increase overall light output, higher energy savings can be achieved by redesigning lighting to meet appropriate lighting level):
    - i. Avoid halogen lamps (MR16s) for general lighting (where used for accent lighting look for alternatives)
    - ii. Use Indirect/direct lighting fixtures that complement daylight and that can achieve lowest energy consumption
    - iii. Evaluate high output T5 and T8 fluorescent fixtures (instant on, dimming capable, longer lamp life) in lieu of metal halide fixture
- ❑ Develop preliminary lighting control system
  - a. Evaluate occupancy controls
  - b. Evaluate daylighting control scheme, to reduce annual lighting energy consumption. Consider window placement and room layouts, review to optimize
- ❑ Estimate the power requirements for future tenant equipment
- ❑ Optimize the energy efficiency of vertical transportation systems
  - a. Evaluate occupancy controlled escalators (cost effective) and high efficiency elevators (potential innovation LEED point)
- ❑ Develop strategies to shave peak demand
- ❑ Summarize lighting issues for Comfort and Productivity Performance Plan
- ❑ Review: Does the design of this system complement or compromise any other system?

8: Upgrades to Existing HVAC System

- ❑ Identify specific performance objectives
- ❑ Evaluate existing systems, are they due for replacement?
- ❑ Evaluate current ventilation for new building use
- ❑ Define load on HVAC for new building use
  - a. Envelope, (windows, walls, roof, etc. - include thermal bridging effects), interior gains (lighting, plug loads) and ventilation
  - b. Consider any changes in space and layout and their subsequent impact on HVAC system zoning
  - c. If relevant to future HVAC operation, measure current loads to determine sizing and design parameters
- ❑ Complete energy simulations assessing whole building design performance. (Use an energy simulation model for all following evaluations of energy efficiency measures)
- ❑ Consider thermal storage options using mechanical systems
- ❑ Develop preliminary design for ventilation, heating, and cooling delivery systems
  - a. Evaluate current system's ability to meet loads efficiently
    - i. If HVAC requires more capacity, evaluate relative costs and benefits of envelope upgrades and measures to reduce loads or to increase HVAC capacity
    - ii. If current system is constant air volume (CAV) system (dual or single duct), consider conversion to variable air volume (VAV), evaluate impact on ventilation
    - iii. If current system is single-zone rooftops, evaluate high performance rooftops for additional capacity
  - b. If completely new HVAC system, evaluate different systems for energy efficiency, indoor environmental quality (IEQ), and integration with building. Consider:
    - i. 100% fresh air systems with distributed heating and cooling (e.g. heat pumps, local heating/cooling coils, radiant heating/cooling) offer excellent energy saving opportunities, excellent ventilation and indoor air quality (IAQ), low noise and minimal HVAC service space requirements
    - ii. VAV systems offer good energy saving opportunities, average ventilation effectiveness (careful design required). Always include air side economizer

iii. CAV systems can, in some circumstances, (system primarily serves internal spaces with year round constant cooling requirements) be energy efficient, offer good ventilation, simpler design and controls. Always include air side economizer

[Note: these descriptions should also be a part of evaluation of current HVAC system]

c. If single-zone rooftops, replace poorly performing units.
   i. If additional/replacement units required evaluate high efficiency (CEE Tier 2) units. At minimum include heat recovery, free cooling economizer, and modulating/condensing burners

- ❑ Develop preliminary ventilation, heating and cooling control systems
  a. Ensure opportunities for free-cooling are maximized
  b. Schedule "turn off" of equipment when not needed
  c. Minimize simultaneous heating and cooling operation
  d. Use outdoor-reset strategies to increase part-load efficiencies, and match system output to current weather conditions
- ❑ Develop preliminary design for heating central plant
  a. If retaining existing boiler, consider burner replacement to increase efficiency. (Variable output burners can increase part load efficiency)
  b. If replacing boiler, evaluate condensing boilers. This requires low temperature return water, using larger heat delivery devices (e.g. fan coils, larger baseboard radiators, larger radiant panels, or in-floor heating). If cost constrained, evaluate multiple boilers with only the lead boiler being condensing
  c. If replacing boiler, specify, at a minimum, a high-efficiency or near-condensing boiler
  d. Specify new boiler(s) to address part load efficiency operation
     i. Use multiple boilers
     ii. Staged or variable output boilers
  e. Use higher temperature drop heat distribution devices to reduce return water temperature (see comment above on condensing) to lower pumping power and increase efficiency of all boilers
  f. Evaluate variable speed drive (VSD) hot water loop pump
     i. In conjunction with VSD, evaluate 2-way valves at coils, radiators etc., to decrease return water temperature during part load operation
- ❑ Develop preliminary design for cooling central plant
  a. Evaluate existing system refrigerant. (CFCs, phased out by Montreal protocol, should be retrofitted to HFCs (best) or HCFCs systems.) If major retrofit required to accomplish this, evaluate in conjunction with high efficiency retrofit options
  b. If replacing chiller, generally air cooled is more cost effective (using life cycle) below 200 tons; water cooled above 200 tons
  c. Always include/retrofit cooling tower economizer for free-cooling with new or existing water cooled chiller
  d. Include variable speed fan drive on cooling tower for new water cooled chiller; for existing, evaluate retrofitting same
  e. Specify new chiller to address part load efficiency operation
     i. Use multiple chillers
     ii. Stages or variable output chillers
  f. For new chillers evaluate zero ozone depletion options (Montreal protocol began phase-out of HCFC in 2005, more HFC options are available everyday)
  g. For new chillers evaluate high efficiency options
  h. Evaluate low energy cooling options (natural ventilation/cooling, evaporative cooling)
- ❑ Heat Recovery
  a. Exhaust air heat recovery almost always cost effective and can be single largest energy saving measure
  b. Evaluate potential for heat recovery off chiller condenser
- ❑ Summarize HVAC issues for Comfort and Productivity Performance Plan
- ❑ Prepare the Design Development Report.
- ❑ Review: Does the design of this system complement or compromise any other system?

9: Materials Selection Checklist

- ❑ Identify specific performance objectives
- ❑ Minimize use of materials or components that rely on scarce material resources
- ❑ Select materials that balance durability and low embodied energy
- ❑ Consider re-use of components, and salvaged, reclaimed, and/or recycled materials
- ❑ Consider use of tiles or modular products rather than sheet goods to minimize extent of replacement of worn or stained areas in the future
- ❑ Design assemblies and their connections to facilitate future demountability and deconstruction
- ❑ Select indoor finishing materials to minimize volatile organic compounds (VOC) and other emissions. Consider in particular the following major items:
  - Caulking
  - Sealants
  - Mortar and Joint compounds
  - Fibrous and Rigid Insulations
  - Millwork
  - Plywood, Fibreboards, Chipboard
  - Window Coverings
  - Furnishings (desk, chairs, associated fabrics)
  - Floor coverings, underlayment, undercushion
  - Paints and wall coverings
  - Trim
  - Ceiling tiles

- ❑ Review: Does the design of this system complement or compromise any other system?
- ❑ Note: Almost all materials and product manufacturers produce MSDS (Material Safety Data Sheets) that can be supplied to the architect or consultant upon request. The MSDS sheets can often be found on the manufacturers' website. For improved indoor air quality, common substances to avoid in materials selection include:
  - VOCs
  - Formaldehyde
  - Isophorone
  - Vinyl chloride
  - Methylene chloride
  - 4-phenylcyclohexene (4-PC)
  - Ethylbenzene
  - Styrene
  - Napthalene
  - Benzene
  - Phthalate esters
  - Methyl ethyl ketone
  - Acrolein
  - Methyl isobutyl ketone
  - Acrylonitrile
  - Toluene
  - 1,2-dichlorobenzene
  - Xylenes
  - Acetone
  - 1,1,1-trichloroethane
  - Carbon tetrachloride
  - Trichloroethylene
  - Tetrachloroethate
- ❑ Heavy Metals
  - Lead
  - Mercury
  - Cadmium
  - Chromium
  - Antimony
  - Nickel

(Reference: The above list of substances is taken from the HOK Guidebook to Sustainable Design)

10: Design and Documentation Checklist

- ❑ Complete site development plan to minimize potable water consumption
- ❑ Modify plumbing and sanitary systems to minimize water consumption
- ❑ Complete enclosure details
- ❑ Finalize lighting system design
- ❑ Finalize ventilation, heating, and cooling system designs
- ❑ Confirm that adequate space exists for data and communications systems
- ❑ Select building energy management control systems if needed
- ❑ Review the use of materials to minimize waste
- ❑ Carry out a final set of energy simulations
- ❑ Produce a final Longevity and Adaptability Plan
- ❑ Prepare the final Life Cycle Cost Report
- ❑ Produce the final Occupant Comfort and Productivity Plan.

11: Construction Quality Assurance Strategies Checklist

- ❑ Develop plan to minimize construction and demolition (C&D) wastes during construction.
- ❑ Develop Final Site Impact Management Plan
- ❑ Develop a Final Quality Assurance Plan
- ❑ Develop a Commissioning Plan for all major systems
- ❑ Prepare the Pre-Construction Report.

12: Operation Quality Assurance Strategies Checklist

- ❑ Appoint an owner's Commissioning Agent
- ❑ Develop a Maintenance and Facility Management Plan
- ❑ Develop Final Environmental Impact Management Plan
- ❑ Develop lease instruments that contain incentives for tenants to operate the space efficiently
- ❑ Train building staff to operate equipment efficiently
- ❑ Prepare and submit a Project Completion Report.

Checklist: Information Required on Land Surveys

1. Ground Elevation and Property Lines

- ❑ Dimensions of property lines.
- ❑ Easements and rights-of-way.
- ❑ Angles at intersections of property lines.
- ❑ Contour lines showing variations of _____ mm in ground elevations. (insert amount of change in elevation to be recorded, such as 300mm)
- ❑ Ground elevations on a _____ mm grid. (insert size of grid, such as 7500mm)
- ❑ Contour lines where abrupt changes in topography occur.

2. Surface Items Inside Property Lines

Provide all pertinent information including sizes, material, location, condition, etc. for the following:

- ❑ Poles
- ❑ Sidewalks, paved areas, driveways.
- ❑ Landscaping such as fences, edge of tree line, trees greater than 100mm, sodded area, hedges.
- ❑ Streams, wells.
- ❑ Perimeter or existing buildings fully dimensioned with elevations of the basement and ground floor.

3. Underground Services, Tunnels, Pipe Lines, and Open Ditches.

Provide sizes, location and inverts of the following and indicate if stakeout is required:

- ❑ Underground electric supply lines, telephone, cable tv, water and gas.
- ❑ Sanitary sewers
- ❑ Storm sewers
- ❑ Other pipe lines
- ❑ Tunnels
- ❑ Open ditches, swales.

4. Streets and Sidewalks.

- ❑ Type of material and location of adjacent streets, lanes, sidewalks, and rights of way.
- ❑ Curb lines and locations of curb cut-outs for driveways.
- ❑ Elevation at crown of street, curb.
- ❑ Location of obstructions, clear heights, and location of service or pedestrian doors on service lanes.
- ❑ Distance from property line to centreline of street.
- ❑ Location and elevation at invert and top of manholes, catch basins.
- ❑ Type of material and location of electric, telephone and other utility poles as well as fire hydrants.

5. Adjacent Properties

Indicate if permission must be obtained from abutting property owners

- ❑ Elevations of basement, ground, second floor and roof or parapet of buildings which are immediately adjacent to the site.
- ❑ Provide sufficient spot elevations to indicate surface drainage.
- ❑ Location and identification of party walls on adjoining properties.

Note: This checklist is meant to assist the Architect in providing instructions to a Land Surveyor by identifying the requirements needed when they are engaged to prepare a survey of a particular site. Generally speaking, land surveys shall indicate location and description of any features that would affect construction as well as all easements, alignment restrictions or other special zoning or town planning information, which might determine the location of the building on the property.



2.3 Management of the Project

2.3.5 Schematic Design

Introduction

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Documentation and Presentation

Standard Contract Documents and Checklists

References

Schematic Design

Introduction

Schematic design is the phase of the project during which the client's requirements and desires assume architectural form. The term also represents the important conceptual stage where the architect can provide added value by using creativity and ability to synthesize various, and often competing, requirements. At this stage, the architect and the client agree on an architectural concept representing a synthesis of the following elements:

- the nature of the site;
- the space planning requirements described in the client's program;
- the self-image or philosophical objectives of the client;
- the design approach of the architect.

In schematic design, the architect and the client discuss and confirm the key issues of the project and agree on the architectural form to accommodate them. This form should be based on a design brief or functional program developed during pre-design (refer to Chapter 2.3.4, *Pre-design*). The benefits and value of preparing a well-thought-out program cannot be overstated.

Throughout the schematic design phase, the architect tests the client's program by studying various planning and massing relationships, always within the constraints of the project budget. Ideally, schematic design will conclude with a design which is the best possible synthesis of all the factors being considered.

Schematic designs may be developed using an Integrated Design Approach which involves a multi-disciplinary team of design professionals as well as the client as a core team member. Sometimes a facilitator is involved to assist the team in establishing sustainable goals and in considering the impacts of all design decisions on the life cycle of the building. Inevitably there will need to be trade-offs (such as incorporating high performance windows and thereby reducing the size and cost for mechanical equipment). The sustainable vision for the project should involve documentation of all design decisions. Integration at the schematic design stage of appropriate site development, building envelope characteristics, and mechanical and electrical systems optimizes the contribution of each design discipline.

Also new software developments allow architects to undertake preliminary modeling and develop rapid prototypes as well as document the building as a three-dimensional model using Building Information Modeling or BIM. These new techniques mean that the design work is more "front-end loaded" or more intensive during the schematic design and design development phases and therefore schedules, staff time and invoicing must be adjusted accordingly.

As the design character emerges, the need to change program details may become evident. The schematic design process provides a method for fine-tuning elements of the client's requirements and adjusting spatial relationships before beginning design development.

Schematic design is also the stage when the architect assembles the design team, including sub-consultants who:

- become familiar with the opportunities and challenges presented by the building site;
- investigate different types of construction materials, systems, and contractual methods;
- may obtain detailed site information, including all services such as water, sewer, gas;
- establish the project's technical principles;
- review their proposals with the architect and the client.

Refer also the Site Evaluation Checklist in Chapter 2.3.4, *Pre-design*.

Client-Architect Relationship

The most successful projects result when the client participates actively in the development of the design. Throughout schematic design, the architect-client dialogue continues, as proposals for specific responses to the project's requirements are put forward by the architect. It is important for the parties to remain in agreement over the fundamental issues outlined in the functional program. To facilitate effective client participation and to maintain the trust between the parties, the architect must encourage communication and ensure that all design issues and construction budgets are presented and open to discussion. Minutes of design meetings should be taken and circulated.

Timely client involvement will help resolve difficulties with program elements or highlight the need to modify the program. Budgets must be reviewed to ensure that the proposed solution meets all functional requirements; alternatively, the budget can be adjusted. With a speculative building project, or with alternative construction project delivery systems, the architect may not have access to a community of users. In this instance, the client is considered the user representative. The architect may request that the client formally confirm certain decisions with recognized user groups or associations.

To ensure that projects run smoothly and design time is optimized, the architect should insist that clients provide timely approvals and information on functional requirements.

Information Required at Schematic Design

The client is responsible for providing functional program addressing:

- functional requirements and spatial relationships;
- flexibility and provision for expansion;
- special equipment and systems;
- site requirements;
- construction budget;
- time frame or schedule.

In addition to the program, the client is responsible for providing full documentation of site conditions, including:

- legal and physical surveys;
- reports on sub-surface conditions, including the presence of hazardous materials or other pollutants;
- any other professional reports or opinions from specialist consultants that will have an impact on the work.

If the client does not have all this documentation, the architect may help procure it, acting as the client's agent. Alternatively, the architect may insist that the client retain specialists to provide the necessary information, partly because the architect's liability insurance will not cover certain sub-consultants.

If the architect and the client do not yet have a clearly defined understanding of project objectives, schematic design should be delayed until the appropriate information is available and intentions are understood. Assistance with programming and obtaining missing information are considered additional or optional services and, should be billed accordingly.

As the schematic design process continues, the architect applies technical and regulatory knowledge by:

- incorporating appropriate construction materials and methods;
- ensuring compliance with building codes;
- dealing with occupational health and safety codes;
- ensuring that local zoning and urban design requirements are met.

Before proceeding to design development, architects must fully investigate planning and technical requirements as well as regulations of Authorities Having Jurisdiction (such as environmental impact, site plan control, zoning, parking requirements, and limiting distances). A general overview, rather than a detailed analysis, of building code compliance is necessary at this stage.

Space, Circulation, and Massing Studies

As part of the preliminary analysis of a new commission, the architect will often prepare a series of space diagrams to identify the comparative size and relationships of the functional areas and spaces required. Proportions and volumes can be established and, with the data rationalized to this extent, the preliminary architectural planning and designing can be more realistically undertaken.

In addition, pedestrian and vehicular circulation diagrams — linking the relevant spaces and applicable site constraints — can be undertaken, usually concurrently. Consultant input, especially related to mechanical and electrical space requirements as well as vehicular traffic and vertical transportation systems, may be sought at this stage.

On large and complex projects, the architect should ask the client to approve such diagrams as they are developed.

Having undertaken and established some basic planning relationships in the form of these flow and space diagrams, the architect, with input from the design team, must then consider the overall form which the project could take.

Using sketches and block models, the architect investigates various forms and relative volumes for the building project. From such massing studies, the architect can:

- establish the sculptural quality of the building;
- visualize the space between buildings (proposed and existing);
- determine the effect of sun, shade, snow, rain, and wind on the project and its surrounding environment.

Engineering Services for Schematic Design – Integrated Design

The Integrated Design Process helps to ensure that all building systems and components, such as site design, structure, orientation, envelope, lighting and ventilation are viewed as interdependent. During the schematic design phase, the architect usually facilitates the design team, including structural, mechanical, and electrical engineers. Other specialist sub-consultants may be required, depending on site conditions and programmatic requirements. Engineering sub-consultants help prepare the construction budget submitted at the completion of the schematic design stage (refer to Chapter 2.3.3, *Cost Planning and Control*). The project will progress more smoothly if the consultants become familiar with the site and program requirements early on in the process.

Engineering sub-consultants also help prepare the construction budget submitted at the completion of the schematic design stage (refer to Chapter 2.3.3, C*ost Planning and Control*).

As the general form of the facility emerges from programmatic data, engineers from the various disciplines work with the architect to develop structural, mechanical and electrical, designs and building system concepts which are appropriate to the project goals. Early involvement by design engineers is a significant factor in obtaining the synthesis of building elements that can lead to reduced capital costs and improved building performance.

Design Alternatives: Evaluation and Selection

The project program may include more than one possible path to follow for planning or for developing architectural concepts. In these circumstances, the architect may prepare design alternatives for the client to consider.

At the schematic design stage, design alternatives should involve quick diagrammatic studies to address issues such as circulation, planning, and volumetric aspects of the project, without developing architectural detail. Some clients may want to review multiple options, thinking that this demonstrates a thoroughness of process. These options should be limited to simple planning diagrams. The number of options should be limited and based upon the fee proposal and the agreement with the client. One design alternative should then be selected and developed in more detail. The architect must strike a balance between providing an appropriate level of basic

services and undertaking extensive studies that should be identified (and billed) as optional or additional services.

Design alternatives should be evaluated and selected on the basis of:

- completeness of response to program elements;
- success in resolving functional relationships and adjacency requirements;
- compliance with previously established sustainable goals;
- the merits of alternative structural, mechanical, and electrical systems;
- comparisons of building efficiencies, including:
  - ratio of net to gross floor areas;
  - ratio between circulation and usable floor areas;
  - wall surface to floor area ratios;
  - capital, operating, and maintenance costs.

Building Cost Analysis

During schematic design, the architect prepares preliminary cost estimates, usually based on the area or volume of the proposed building, multiplied by the appropriate unit costs (refer to Chapter 2.3.3, *Cost Planning and Control*). Sometimes it becomes clear at the schematic design phase that the client's expectations cannot be met within the current budget. In this case, the architect needs to work with the client to adjust the scope of work or the quality, or alternatively, provide for an increase in the budget.

Documentation and Presentation

Schematic design documents illustrate the functional relationships of the project elements as well as the project's scale and character, based on the final version of the functional program, the schedule, and the construction budget. The design documents may include:

- a site plan;
- principal floor plans;
- vertical sections;
- building elevations;
- illustrative sketches or perspective renderings, computer-generated presentations;
- massing models.

In addition to design documents, it is often appropriate to prepare a report containing the following:

- design approach or philosophy;
- sustainable goals and environmental features;
- probable construction cost (with appropriate qualifications — refer to Chapter 2.3.3, *Cost Planning and Control*);
- summary of status of design with respect to applicable environmental, planning, and zoning regulations as well as building codes;
- preliminary schedule for design and construction start and completion and the form of construction procurement;
- description of structural, mechanical, and electrical systems;
- basic area calculations and analyses;
- site data;
- product and material description and sample of key construction materials or finishes.

The architect reviews the documents with the client and should obtain written approval before beginning design development.

Standard Contract Documents and Checklists

A list of the services to be provided in the schematic design phase is contained in Schedule A or Schedule B, Schedule of Architect's Services and Client Responsibilities, for use with the *Canadian Standard Forms of Contract Between Client and Architect: RAIC Document Six and in Schedule A -Schedule of Architect's Services and Client's Responsibilities of Canadian Standard Forms of Agreement Between Client and Architect — Abbreviated Version: RAIC Document Seven*.

A detailed "Checklist for the Management of the Architectural Project," including requirements during the schematic design phase, is available at the end of Chapter 2.3.1, *Management of the Project*.

References

Allen, Edward and Joseph Iano. *The Architect's Studio Companion: Technical Guidelines for Preliminary Design*. Toronto, Ont.: John Wiley & Sons, 1989.

Buildinggreen.com—Articles related to Integrated Design Process
www.buildinggreen.com

G.F. Shymko and Associates Inc. "C-2000 Design Facilitation, Overview of Facilitation Experiences in the Alice Turner Branch Library." Vancouver, B.C.: May 1998.

Larsson, Nils. "The C-2000 Program: Changing the Design Process." Ottawa, Ont.: Natural Resources Canada, September 1998.

The Royal Architectural Institute of Canada. Ottawa, Ont.

Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six. 2006 Edition.
Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: Document Seven. 1997.

Whole Building Design Guide
www.wbdg.org/design/engage_process.php



2.3 Management of the Project

2.3.6 Design Development

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Introduction

Design Development Tasks

Engineering Services for Design Development
- Structural
- Mechanical
- Electrical
- Other Consultants

Regulatory Reviews and Approvals

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- Drawings
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Suggested Table of Contents for a Design Report

Design Development

Introduction

During the design development phase, the selected scheme — which was prepared during the schematic design phase — is **refined and developed in more detail**. Refer to Chapter 2.3.5, *Schematic Design*, for a discussion of this first phase of the project.

Because it is sometimes difficult to differentiate between when the schematic design phase ends and when the design development phase begins, some architects and most engineers combine these two early phases into a single phase, termed "preliminary design." However, it is advantageous to obtain initial approval of the early concept from the client before proceeding to more specific design details. Engineers and some clients frequently use the term "design" to refer to construction documents as well as preliminary design. It is important to have a mutual understanding of each phase and to plan for the appropriate documentation when communicating with engineers. The distinction between all the three phases - schematic design, design development and construction documentation - is very clear in the French language (esquisse du projet, projet préliminaire and projet définitif).

Once the design is developed and accepted by the client, the project can move into the next phase — construction documentation. Refer to Chapter 2.3.7, *Construction Documents — Drawings*, and Chapter 2.3.8, *Construction Documents — Specifications*, for this stage of a project.

This chapter briefly describes the services of the architect during the design development phase of a project.

Design Development Tasks

The various alternative Schedules of Architect's Services and Client Responsibilities to be attached to of the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six* outline some of the architect's responsibilities during design development. During this phase, refining the design usually entails the following tasks:

- preparation and coordination of all architectural, structural, mechanical, and electrical designs;
- preparation of outline specifications;
- performing preliminary modeling and simulations (such as energy analysis and daylight simulation) if included in the architect's services;
- additional review with Authorities Having Jurisdiction;
- preparation of presentation documentation (such as drawings, models, computer renderings, as agreed to in the client-architect agreement);
- update of the construction cost estimate;
- update of the schedules for design, preparation of construction documents, and time frame for construction.

During the design development phase, it is important to resolve the design of all major components. At this stage, the input and collaboration of the consultants is critical to the success of the project. A well-integrated design will minimize delays and coordination problems during the next phase of the project. Major revisions at a later stage will be costly to the client, the architect and consultants and can result in compromises to the architectural design concept.

During design development, the client is responsible for the following:

- reviewing and commenting on the design;
- providing approval of the design and authorizing the preparation of construction documents.

One of the roles for the architect during design development is to investigate various manufactured products for incorporation into the future building. Sometimes the functional program outlines the requirements for durability and maintenance of certain products. During design development, the architect should assess the maintenance and durability of various materials as well as their cost and performance to determine if they meet the client's needs.

Prior to making a final recommendation to the client, the architect can review the following factors:

- availability of the product or system from the manufacturer or supplier as well as the types of warranties available;
- availability of technical data, samples, and literature on the product;
- performance criteria (including sustainability, suitability for application and compatibility with other materials);
- durability and maintenance requirements;
- physical characteristics and availability of various colours, finishes, textures or other features;
- fabrication and installation requirements;
- cost;
- time for delivery;
- past performance;
- comparative analysis with similar products in the marketplace.

Engineering Services for Design Development

As previously indicated, continuing to coordinate the design work at this stage with all engineering disciplines is critical to the success of the project. Collaboration with the engineers should begin in the schematic design phase of the project and continue intensively during design development.

Structural

During the schematic design stage, the structural engineer usually develops alternative framing plans which indicate basic elements such as typical bays and their spacing together with their associated costs. The engineer may analyze various framing systems such as concrete, steel, and timber. At this stage, an economical and functional framing system and appropriate bay size is usually selected; however, the architect and engineer must also take into account a number of other considerations such as availability of the material and appearance of the system. This decision is also frequently dictated by functional considerations.

Subsequently, in order to commence design development, the architect should provide the structural engineer with the following information:

- the soils or geotechnical report (usually prepared at pre-design stage and supplied by the client);
- the selected schematic design;
- restrictions regarding the locations of columns or other structural supports;
- defined areas, including use, size, and finishes;
- preliminary code analysis including fire separations and fire ratings;
- the size and locations of openings;
- construction materials;
- a confirmation of the method of construction project delivery and the expected time frame which was selected by the client in the schematic design phase.

Some of the design issues which must be resolved with the structural engineer and the members of the design team through an Integrated Design Process include:

- typical bay framing, including typical sizes of beams and columns;
- maximum depths of members and all critical sizes of members;
- size and location of openings through the structure for all work by other disciplines;
- minimum ceiling clearances to the underside of the structure and all floor to floor heights;
- identification of items to be embedded into the structure;
- requirements regarding fire ratings and fire separations;

- provisions for special equipment and typical mechanical equipment, including window washing equipment, mechanical rooftop units, self-leveling docks, chimneys, slab depressions, etc.

Mechanical

The client's requirements for operation and maintenance (for example, availability of stationary engineers) and the requirement for emergency standby and dual-equipment systems should have been included in the functional program. If these were not part of the program, the architect should assist the engineers in determining the client's requirements and ascertain if the mechanical design meets these needs.

To undertake design development, the mechanical engineer will require various types of information, including:

- the selected schematic design;
- type of glazing and type of window coverings;
- hours of use of the building;
- allowable variation in room temperatures and humidity;
- areas requiring special treatment for air conditioning, fire protection, plumbing, noise;
- preliminary code analysis including fire separations;
- requirements for mechanical system controls and special controls and energy management;
- analysis of water and special waste removal equipment;
- other special equipment, such as lawn sprinklering systems.

The architect or the client may provide some of this information, or the mechanical engineer will obtain some of the information directly from the appropriate authorities.

During the design development phase, the mechanical engineer selects and resolves select and resolve the following:

- natural ventilation
- central versus individual heating and cooling plants;
- size of air conditioning equipment;
- size of heating system;
- special HVAC systems such as heat recovery systems, heat pumps;
- energy analysis and modeling, if part of the agreed professional services;
- size and location of major ducts and pipes;
- approximate size of all mechanical equipment;
- plumbing fixtures and controls;
- other features, such as noise control, vibration dampers, special controls.

In addition to preparing a set of design development drawings, the mechanical engineer usually develops information on future operating costs for the proposed building. This information should provide the operating costs of mechanical equipment for various options of building materials in order to assist the architect in making a final recommendation to the client regarding all components of the building envelope and assembly.

Electrical

To undertake the design development documents, the electrical engineer requires the following information:

- the selected schematic design;
- information on typical areas, including function, size, finish and materials, lighting levels;
- the future expansion and flexibility required for each space;
- the method of construction project delivery and expected time frame.

During the design development phase, the electrical engineer resolves the following design issues related to the electrical systems:

- the anticipated electrical load and allowances for future expansion;
- requirements of incoming electrical services and any space requirements for a vault or sub-station;
- the distribution of power and utilization voltages;
- locations for electrical closets, communications rooms, bus-duct risers;
- requirements for embedding conduits;
- light fixture selection and requirements for ceiling systems and ceiling space;

- switching and controls for energy efficiency;
- telecommunications and data systems, fire alarm systems, public address systems, intercom, security.

For the lighting design, the architect works with the electrical engineer to develop lighting layouts. This layout is often developed with the use of the architectural reflected ceiling plans with input from the electrical engineer or a specialist lighting consultant.

Other Consultants

In addition to the consultants providing normal engineering services, many other consultants may be involved at the design development stage of a project. Refer to Chapter 1.2.3, *Consultants*, for a list of some of the consultants required for different architectural projects. It is also necessary at this stage of a project to determine the requirements from certain manufacturers of various building systems such as elevator companies and suppliers of wall cladding systems.

Regulatory Reviews and Approvals

The architect should have commenced the review with Authorities Having Jurisdiction during the schematic design phase of a project; however, it is important to maintain contact with authorities and to review certain details with the appropriate Authority Having Jurisdiction. Development permits and planning approvals are frequently obtained at the design development phase. Building permits and some other approvals are usually not obtained until the completion of construction documents; however, if the Authority is aware of the details and content of the project design, approval is facilitated.

Refer also to Chapter 1.2.4, *Building Regulations and Authorities Having Jurisdiction*.

Building Cost Analysis

The architect or a cost consultant may prepare an updated estimate of the construction cost during design development. Additional design information from the design development phase facilitates the preparation of a more complete and accurate estimate with a reduced contingency allowance. Refer to Chapter 2.3.3, *Cost Planning and Control*, for information on construction cost estimates and the requirements at the design development stage.

Documentation and Presentation

The design development documents are used for a variety of purposes and by several participants in the design process. Some of the uses of these documents include:

- client review and approval;
- reviews with Authorities Having Jurisdiction and public groups;
- consultant input and coordination;
- update of construction cost estimates;
- the basis to prepare the construction documents.

The documents should adequately describe and "finalize" the design for the entire project in order to form the basis for reviews and for the completion of construction documents. For projects of a certain scale, design development documents may include three separate components:

- drawings;
- outline specifications;
- a design report.

Drawings

The drawings produced at the design development stage should provide adequate information to the client, consultants, and Authorities Having Jurisdiction to explain major components of the project. Depending on the size and complexity of the project and the services outlined in the client-architect agreement, the drawings may include the following:

- the site plan (in some jurisdictions, it is necessary to prepare a detailed site plan for site plan approval or the site plan control process at this stage);
- all floor plans and all building elevations;
- sections;
- plans describing the structural, mechanical, and electrical systems;
- details of significant design features and building materials;
- preliminary furniture and equipment layouts;

- presentation drawings which might include computer renderings, colour boards, interior and exterior views.

Outline Specifications

It is important at this stage of the project to present, review, and obtain approval from the client and other stakeholders of major building components and the site design. This is usually achieved in part through the preparation of a an outline specification which describes the proposed materials and construction systems in general terms and provides basic information on appearance, texture, operating and performance criteria, etc. This type of specification is described briefly in Chapter 2.3.8, *Construction Documents — Specifications*.

Design Report

For some projects, it may be useful or even a contractual requirement to document significant design decisions and design criteria at the end of design development. This is usually accomplished by means of a "design report."

The design report is a tool for use by clients and other stakeholders. It is also useful for those who may not be familiar with the project to better understand the design, such as:

- staff in the architect's office;
- Authorities Having Jurisdiction;
- financial institutions;
- building users and facility managers;
- another architect who may be undertaking construction documentation as part of a joint venture;
- consultants.

It also serves as a record for the project which may require lengthy approval periods or which is subject to delays.

An analysis of the building with respect to compliance with the building code is often included in the design report. A "Suggested Table of Contents for a Design Report" is provided at the end of this chapter.

Checklists

Refer to the "Checklist for the Management of the Architectural Project" in Chapter 2.3.1, *Management of the Project*, which lists management tasks to be undertaken prior to and during the design development phase.

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2.3 Management of the Project

2.3.7 Construction Documents — Drawings

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2.3.7

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Chart: National Building Code Data Matrix

Construction Documents — Drawings

Introduction

Construction documents include the drawings and specifications. These documents guide and direct the contractor and the sub-contractors in the preparation of their price or bid, and in carrying out their "work" on a project. For this reason, drawings are frequently called "working drawings." As part of the construction contract, the working drawings take on a legal significance for which architects must assume responsibility.

This chapter discusses the production of working drawings. Refer to Chapter 2.3.5, *Schematic Design*, and to Chapter 2.3.6, *Design Development*, for information about preliminary design drawings that are prepared prior to the working drawings. Chapter 2.3.8, *Construction Documents — Specifications*, discusses the specifications that accompany and complement working drawings.

Architects should obtain client approval of the design development documents **before** beginning the construction documents. A formal approval should be received in writing to ensure that the client understands the importance of this decision and the expense of producing the construction documents. The project architect should explain to the client that any changes requested while working drawings are being prepared will entail delays (and costs). Any type of change can have a "ripple" effect on a number of different drawings, including engineering working drawings.

Purpose of Drawings

Drawings are a means of communicating information in a two-dimensional format using lines, graphic symbols, and text. Buildings are sometimes designed and documented as three-dimensional models using Building Information Modeling (BIM) which can produce both two-dimensional and three-dimensional drawings for construction purposes. Both types of drawings drawings describe the relationships between building components (sometimes referred to as building assemblies) and the following characteristics:

- location of the component;
- name or identification;
- size and dimension;
- shape and form;
- details or diagrams of connections for the building assembly.

Many different individuals and organizations use drawings for a variety of purposes. The primary users are the contractor, sub-contractors, consultants, the client or owner, and the architect — the parties that are bound to one another to design or construct a building. Other users include:

- Authorities Having Jurisdiction;
- product manufacturers and suppliers;
- financial institutions;
- tenants and end users of the building;
- facility managers and maintenance personnel;
- other construction industry professionals.

The working drawings are used by:

- *bidders:*
  - to prepare bids;
  - to obtain bids from their sub-contractors and suppliers;
- *selected contractor(s):*
  - to form part of the documents for a contract with the client;
  - to guide them in carrying out the work;
- *Authorities Having Jurisdiction:*
  - to verify that the project conforms to existing regulations;
  - to plan for the provision of utilities and services;

- *architects and other consultants:*
  - to obtain bids or prices for construction procurement;
  - to communicate project particulars to clients in order to obtain approval;
  - to prepare "Class A" cost estimates;
  - to review the work on site and to determine general conformity with the intent of the construction documents;

- *clients:*
  - to confirm that the project will meet their particular requirements;
  - to approve this part of the bid package;
  - to form part of the documents for the contract with the contractor.

Planning the Production of Working Drawings

The preparation of working drawings is the project phase that demands the most of the architect's time and resources. It is essential to plan the production to ensure that proper, coordinated documents are produced within the budget of fees allocated for this purpose.

The project architect or project manager is usually the individual responsible for planning the production of working drawings. When scheduling the work, the project architect must consider:

- the available production budget;
- the available human resources;
- the firm's physical resources and computer systems (hardware and software);
- the time frame for production of the working drawings;
- the resources available to the consultants.

The project architect must therefore:

- determine what drawings and information must be produced;
- calculate how much time is needed to produce each drawing;
- assign tasks;
- set the project schedule;
- manage and coordinate the work with all team members.

The project architect in charge of producing the complete set of working drawings coordinates the work of the design team (engineers and other consultants). Usually management and coordination of engineers and other consultants is a part of the architect's services and responsibilities; however, occasionally it is contracted to others.

At the start of the construction documents phase, the project architect should meet with the entire consultant team in order to agree on:

- the production schedule;
- standards for preparing and presenting the drawings;
- protocols for the exchange of information or electronic file transfer (if this has not already been agreed upon in a previous phase);
- financial arrangements for the reproduction and use of all drawings and other instruments of service;
- general coordination methods.

Using traditional two-dimensional drawings, the project architect should provide the team with basic floor plans so that each discipline can develop its own drawings. Engineers should regularly forward their drawings to the project architect to allow time for revision and coordination. Using Building Information Modeling (BIM), the architect must determine how to manage the data and whether to share the particular model, or, to provide two-dimensional CAD files to outside team members.

For smaller projects, the engineers may only produce notes and information which will be included on the architectural drawings. In these circumstances, it is necessary to clearly establish responsibility for the appropriate part of the design and arrange for engineers to append their seal and signature to the drawings.

The "Checklist for the Management of the Architectural Project" in Chapter 2.3.1, *Management of the Project*, can assist in planning the production of working drawings.

CAD Standards

CAD (Computer-Aided Drawing) has replaced manual drafting as the primary method for producing working drawings.

Production techniques may vary within the same office, depending on the human and physical resources available and the nature of the project. Some clients require that drawings be prepared using certain standards.

Standards define the size and style of fonts, dimensions, lines, and hatching or other ways to represent materials. They also suggest various ways to create borders and title blocks, standard details, symbols, etc.

It is especially important to establish a standard system for naming and giving attributes to layers in order to facilitate the development of working drawings and make them user-friendly for consultants and others. Some clients will require electronic files of the working drawings (or record drawings) for the future management of their building. Therefore, architects must often use the client's layering system or other drawing standards.

Some institutions, such as Public Works and Government Services Canada (PWGSC) and large health and educational institutions, have created their own drawing standards. It is important to obtain these standards at the start of the project.

It is important, at the start of the project, to establish protocols for the creation and transfer of electronic information.

The United States National CAD Standard is a consensus standard incorporating industry publications. It is comprised of interrelated standards, guidelines and tools for uniformly organizing and presenting drawing information. It is the only comprehensive standard for facility planning, design, construction and operation drawings. NCS v4.0 is comprised of the National Institute of Building Sciences' Foreword, Administration, and Plotting Guidelines modules, the American Institute of Architect's CAD Layer Guidelines module, and the Construction Specification Institute's Uniform Drawing System modules.

The UDS™ is a guideline which includes the following modules:

- **Drawing Set Organization** (numbering system and sequence for drawings, etc.);
- **Sheet Organization** (system for numbering drawings, details and organizing sheets);
- **Schedules** (format, heading terminology, and organization);
- **Drafting Conventions**;
- **Symbols**;
- **Terms and Abbreviations**;
- **Layers** (see note below);
- **Notations**;
- **Code Conventions** (probably not relevant to Canada).

The Uniform Drawing System™ has adopted the AIA CAD Layer Guidelines which were originally developed and published by the AIA.

Building Information Modeling or BIM

Many architecture practices in Canada have implemented BIM or are considering this fundamental change in the way building designs are conceived, completed and delivered.

BIM is *"the creation and use of coordinated, consistent, computable information about a building project in design that yields reliable digital representations of the building – representations used for design decision-making, production of high-quality construction documents, performance predictions, cost-estimating and construction planning, and, eventually, for managing and operating the facility."*

While BIM's benefits may be numerous, many architectural practices are cautious about the amount of time and financial investment required to change from current practices.

Some of the possible advantages of switching from 2D CAD to BIM include:

- BIM works the way some designers think by using the common language of building elements (wall, door, floor, etc.);
- Document coordination may be enhanced and simplified. A single building information model allows consistent and coordinated views and details to be selected easily for sheet layout and printing;

- 3D visualization can assist the entire project team in understanding the building form, and identifying challenges and opportunities in the design. Clients and lay people appreciate the visual imagery of 3D modeling and increasingly expect it. BIM software allows for visual output, ranging from simple grey scale 3D representations, cut-away 3D sections, to photorealistic renderings from a single building information model without the need for specialized software or skills;
- Collaboration with other architects, designers and consultants may be simplified with the interoperable platform of BIM software;
- BIM models can be exported to common two-dimensional drawing formats (such as .dwg or .dxf), and to spreadsheets to create schedules (invaluable for costing, material take-offs, etc.)

In addition, Building Information Models have great potential for expanding architectural practice through their various embedded analysis tools. As sustainable design becomes fundamental to many architects, the ability of BIM to embed energy modeling within the program or to export data to similar analysis programs becomes an advantage over traditional 2D or 3D software programs. Similarly, the parametric qualities of BIM objects allow designers to quickly do quantity take-offs for costing; areas for leasing and functional programming, and to create custom schedules for virtually all building components including doors, equipment, millwork and finishes. There is an emerging potential for Building Information Models to be used for facilities management and therefore an opportunity for architectural firms to diversify their services.

Building Information Modeling does present unique challenges for the profession including the development of new internal office protocols; the "ownership" of the model; and the need for new forms of agreement.

Drawing Information

The amount and type of information that must be provided on the working drawings are a function of:

- the complexity of the project;
- the type of construction project delivery, including the bid and type of construction contract.

When the project involves restoration, renovation or an addition to an existing building, drawings should clearly indicate the limits of the work, existing elements, and conditions prevailing at the junction of existing and new construction components.

The form of project delivery has an impact on the working drawings.

For projects involving a public bid call or using a project delivery method with a stipulated price contract, drawings should be complete and comprehensively detailed to avoid requests for contract changes by the contractor (whose identity is not known when the drawings are prepared). If, on the other hand, the contractor has already been chosen and has previously worked on similar projects with the architect and the client, the drawings may not have to be so detailed. With some forms of contract and project delivery methods, construction documents may be supplied as the work progresses.

When the project is being carried out as a construction management contract and is divided into separate bid packages, with a bid call for each, there may be several deadlines for the production of working drawings. In such cases, timely and thorough coordination of all documents is essential to avoid overlapping or conflicting requirements. Bid packages, including the working drawings, should correspond to clearly defined and self-contained elements, such as:

- Bid Package No. 1 — Demolition;
- Bid Package No. 2 — Excavation, Foundation, and Structural Framing;
- Bid Package No. 3 — Building Envelope and Mechanical and Electrical Services;
- Bid Package No. 4 — Interior Finishes.

On a project involving the use of new or unusual construction procedures, the drawings should furnish the corresponding details.

In all cases, the final set of working drawings, together with the Project Manual (Specifications, Contract Forms and Contract Conditions, and

Bidding Information), should provide sufficient information needed to:

- **prepare** bids or accurate construction cost estimates (quantity and type of materials and their application);
- **obtain** the building permit and other approvals from Authorities Having Jurisdiction;
- **construct** the project.

Organization of Drawings

To produce working drawings, one must first create a list of information required, including a preliminary list of drawings. Drawings and documents prepared during the design development phase may be used to determine which construction details must be drawn. This list also enables the project architect to ascertain which elements require additional research or information from the client or consultants. The format of all drawings, including those of the engineers and consultants, should be consistent.

Refer also to the CSA Standard B78.3-M1977 (R1991), *Building Drawings*, for information on preparing drawings.

Scales

In the past, it was necessary to determine and decide on a scale for each working drawing. Today, most computer software is not scale-dependent; however, it is important to determine the scale for any hard (paper) copy. Generally speaking, the smallest scale in which information can be clearly presented is chosen. Hard copies that are reduced for distribution must still be legible. A graphic scale should be indicated on these documents.

List of Drawings, Numbering, and Sizes

Each sheet of the working drawings must have a title and a number. The Uniform Drawing System™ provides guidelines for a standard, yet flexible, system of title blocks and sheet numbers.
The range of ISO formats may be used for the sizes printed drawing sheets (refer to Illustration 1). This range offers the following features that are useful when drawings must be reproduced on a larger or smaller scale:

- the surface area of each format is twice that of the preceding format;
- any two consecutive formats have the same height-to-width ratio (that is, the same proportions).

Clients may sometimes have their own format for title block and sheet sizes, and many architectural practices have developed their own specific preferences and designs.

Title Block

The title block may contain the following information:

- project name and address/location;
- project number;
- date including date of first issue and dates of all revisions;
- purpose for issuing the drawing;
- drawing title;
- drawing number;
- scale;
- details indicating revisions (such as revision number, date, general description, initials of the originator);
- name and contact information
  [Note: in many provinces, the name of the holder of the Certificate of Practice must appear];
- name or initials of the draftsperson and the

Illustration 1: ISO Formats

Format name	A0	A1	A2	A3	A4	A5	Etc.
Surface area in m^2	1	0.5	0.25	0.125	0.0625	0.03125	Etc.
Dimensions in mm	841 x 1189	594 x 841	420 x 594	297 x 420	210 x 297	149 x 210	Etc.

individual checking the drawing;
- a location for applying the professional seal and signature.
  [Note: refer to the regulations of the provincial associations of architects for regulations on applying the professional seal. See also the chart, "Comparison of Provincial Requirements/Guidelines regarding the Application of Seals," in Chapter 1.1.5, *The Organization of the Profession in Canada*.]

Usually, the drawing (either in the title block or elsewhere) includes the following information:

- key plan, indicating the relationship of partial plans to the overall plan, orientation, etc.;
- the electronic file name;
- dates and notations indicating the purpose for issuing the drawing (such as "Issued for Bid" and "Not for Construction");
- notice of copyright.

Refer to Appendix A of this chapter for more information on copyright.

Refer also to Section 5.2, "Drawing Notations", in Chapter 2.4, *Sample Forms for the Management of the Project*.

Depending on the type of project and the contractual arrangement with the consultants, as well as the requirements of the professional liability insurer, the title block includes the name, address, telephone, and fax numbers of engineers or other consultants. Also, the architect should confirm the requirements of the provincial association.

Notes, Symbols, and Dimensions

Notes, symbols, abbreviations, dimensions, and references to other drawings should be expressed in the same way on all the drawings, using recognized conventions.

Notes on the drawings should be kept to the minimum necessary to understand the architect's intentions. (References to standards and instructions about the execution of the work should be included in the specifications, not on the drawings.) Standard symbols should be used to show structural grids on the plans, as well as references to elevations, sections, details, and enlarged plans. References to sectional views, windows, and details are usually indicated on the elevations. References to details are usually indicated on the cross-sections and wall sections.

If a material is identified on the drawings by a generally accepted symbol, a defined symbol or a generic name, no further descriptive notes are necessary. Too many notes obscure the drawings, increase search time to find information, and promote inconsistency and duplication. Repetitive items such as doors, windows, and interior finishes should only provide a reference to identify the material or components. Schedules — such as room finish, door, and window schedules — should be used to simplify and clarify repetitive information.

Drawings identify a material or product only by a generic name, and illustrate its approximate shape, dimensions, and location.

Generally speaking, plans indicate the length and width of buildings as well as the width and thickness of walls, whereas elevations and vertical sections indicate height. Drawings should include all of the plans, elevations, sections, and details necessary to carry out the work.

The method of dimensioning should correspond to the sequence of construction. For example, new elements that are to be added should be identified in relation to previously constructed elements such as the structural system or existing walls.

If the total of a set of dimensions must add up to a given dimension, it may be necessary to give an approximate value for one dimension or even to omit one of the less critical dimensions.

Refer to the Checklist: Internal Review of Drawings at the end of this chapter for a detailed list of information that is recommended to be included on all plans and drawings.

Coordination of Drawings

The project architect needs to be fully aware of the progress of the drawings. Therefore, at intervals appropriate to the project's complexity, the project architect may:

- arrange internal and external coordination meetings;
- review and revise drawings as they are being developed.

It is particularly important to plan regular meetings and to exchange information with project engineers on an ongoing basis. The project architect usually notes and documents the following:

- decisions;
- suggested changes;
- new requirements from the design team.

Coordination of the drawings with specifications is also necessary. In particular, the drawings and the specifications should use the same generic terms to avoid ambiguity and therefore reduce the risk of disputes during the execution of the work. Standard construction contracts (such as General Conditions 1.1 of CCDC 2) indicate that the specifications govern, or take priority over, the drawings in case of discrepancies between the drawings and specifications. CCDC 2, GC 1.1.7 also indicates that "*drawings of a larger scale shall govern over those of smaller scale of the same date*" and that "*later dated documents shall govern over earlier documents of the same type*".

Client-supplied equipment must also be coordinated. Client changes to the program or modifications to the layout can have far-reaching consequences at this stage and the architect should be remunerated accordingly. If the architect is engaged to manage and coordinate the consultants, then the project architect will arrange for each confirmed change to be:

- communicated to the various engineers and consultants;
- integrated into the working drawings and other construction documents.

The best tool is a **checklist** which outlines all the steps in producing and coordinating a complete set of construction documents. Some examples of checklists are found in the following publications:

- *REDICHECK Interdisciplinary Coordination;*
- *Cross Check: Integrating Building Systems and Working Drawings.*

Depending on the scale and complexity of the project, the architect may carry out the following review procedures:

- conduct interim and final reviews before completing the working drawings;
- ensure that the client reviews the drawings and specifications;
- ask a senior architect in the practice who is not associated with the project to check the drawings;
- require different individuals to conduct partial reviews (for example, dimensions, details, notes);
- check all dimensions twice;
- ensure that the specification writer conducts a final review of the working drawings.

Refer also to Chapter 2.1.9, *Risk Management and Professional Liability*, which provides tips for checking drawings.

Revisions to the Drawings

In practice, changes to certain design elements may be necessary as the construction details are reviewed, developed, and coordinated with the details and specifications of engineers and other consultants.

To ensure proper coordination, the project architect may:

- obtain information from the client about special technical needs related to the project (for example, medical equipment);
- inform the client about significant changes (and submit alternative solutions, if possible and appropriate);
- make the client aware of the importance of making decisions and giving approvals quickly.

The engineers and other consultants should also be advised of any modifications or design changes.

To identify revisions, the title block of each revision of the drawings should indicate the date, the reason for the revision, and the nature of the changes.

Engineering Drawings

Structural Drawings

During the preliminary design phases of the project, the architect and the structural engineer should have already determined the structural framing system. During the construction documents phase, the structural engineer prepares:

- detailed calculations of all structural elements;
- plans and details;
- structural sections of the specifications (usually Divisions 03, 05, and 06);
- a final construction cost estimate of the structural components.

Mechanical and Electrical Drawings

Depending on the nature of the project, mechanical drawings are for the trades of heating, ventilation, and air conditioning (HVAC); plumbing and drainage; and specialty trades (such as sprinklers, gas piping). The mechanical engineer usually prepares a separate set of drawings for each trade.

During the construction documents phase, the mechanical and electrical engineers should prepare:

- detailed calculations;
- plans, details, and schematic diagrams;
- mechanical and electrical sections of the specifications (Divisions 21 to 29 inclusive);
- a final construction cost estimate of the mechanical and electrical components.

Coordination of Engineering Drawings

If the architect is retained to manage and coordinate the project team, one of the architect's most important tasks during the production of the drawings is the coordination of the engineering drawings (and drawings from other specialists). Coordination is not to be confused with designing and documenting the technical content contained in the engineering drawings which is the responsibility of each respective engineer. The architect will check that all relevant information is on the appropriate drawing and that the design of one discipline includes the necessary work to accommodate the work designed by another engineer. For example, problems due to the interference of conflicting elements such as ductwork, light fixtures, piping, and the structural framing system must be resolved.

Sharing all necessary information with the engineering consultants as soon as it is available helps to minimize coordination problems. Regular coordination meetings or "interdisciplinary coordination reviews" are also essential for ongoing information exchange and to collectively solve any coordination issues. The earlier that these meetings are held during the production of the drawings, the more "willing" each professional is to accept ideas and revisions from other members of the consulting team. Consultants are less willing to make significant changes to the drawings at a later stage in their production. Any design changes, and the reason for the design changes, should be immediately distributed to all engineers. Using a checklist can be helpful in identifying all elements which require coordination.

Frequently, one of the engineering disciplines is required to redesign or relocate an element. The architect, as manager and coordinator, must decide how and which discipline will make the necessary adjustments. When coordinating and revising the design of one of the engineers, the architect should consider the following questions:

- Which solution would the client prefer?
- Is the architectural concept and design maintained?
- Which is the most efficient and economical approach?
- Are there other alternatives?

With proper interdisciplinary coordination, all those affected by the construction project benefit as a result of fewer Change Orders, requests for time extensions, and liability claims.

Definitions

Attribute: Data (such as a door number or column) attached to an entity, block or symbol within a CAD drawing.

BIM or Building Information Model: A Building Information Model (BIM) is a digital representation of physical and functional characteristics of a facility. As such it serves as a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life-cycle from inception onward. A basic premise of BIM is collaboration by different stakeholders at different phases of the life cycle of a facility to insert, extract, update, or modify information in the BIM to support and reflect the roles of that stakeholder. The BIM is a shared digital representation founded on open standards for interoperability. *from the National Building Information Model Standards (NBIMS) Committee*

Construction Documents: The working drawings and the specifications. (When combined with the contract and contract conditions, these documents form the contract documents.)

Coordinate: to bring (parts, movements, etc.) into proper relation, cause to function together in proper order. *(adapted from the Oxford Concise Dictionary)*

Coordination: the arrangement and direction of work of others by a person (e.g. supervisor) or entity (e.g. general contractor) in a special manner to minimize conflicts, delays, interferences, etc., among such others. *from Carson's Construction Dictionary - Law and Usage in Canada.*

Drawing: Graphic information, which may also contain text, organized on a two-dimensional surface for the purpose of conveying data about a specific portion of a project.

Layer: A group of functionally similar bits of information that can be manipulated or displayed as a unit and possessing common attributes; a property of a CAD drawing used for classifying information in order to control visibility and manipulation; sometimes called a "level."

Schedule: Tabulated information on a range of similar items, such as a "Door Schedule" or "Room Finish Schedule."

References

Canadian Standards Association (CSA). Toronto, Ont.
CSA Standard B78.3-M1977(R1991), *Building Drawings*. 1977.
CSA Standard B78.5-93, *Computer-Aided Design Drafting (Buildings)*. 1993.

Demkin, Joseph A., executive editor. *The Architect's Handbook of Professional Practice*. The American Institute of Architects. Hoboken, New Jersey: John Wiley & Sons, Inc. 2008.

Guthrie, Pat. *Cross-Check: Integrating Building Systems and Working Drawings.* New York, NY: McGraw-Hill, 1998.

Nigro, William T. *REDICHECK Interdisciplinary Coordination*. Third Edition. Peachtree City, GA: The REDICHECK Firm, February 1992.

Ontario Association of Architects, Practice Bulletin 45, Coordination of Consultants, April 1988. To be updated and re-issued as a "Practice Tip".

Sanders, Ken. Digital Architect: A Common-sense Guide to Using Computer Technology in Design Practice. New York, NY: John Wiley & Sons, Inc., 1996.

The Royal Architectural Institute of Canada: Building Information Modeling (BIM) Practice Builder. 2007. *www.raic.org/practice/bim/bim-practice-builder_e.pdf*

United States National CAD Standard, version 4, 2008
www.buildingsmartalliance.org/ncs

Appendix A — Digital Copyright and Architects

Wanda Noel, Barrister and Solicitor

The Issue

People who produce material in digital form often think that "www" stands for the Wild Wild Web. They ask themselves whether freedom on the Internet means the freedom to use the creative works of others, without asking permission, or paying the copyright holder. With a few computer commands, anyone can copy electronic information and transmit it quickly and easily. The challenge facing architects is how to ensure payment for the use of their work when digital technology has made copying and distribution so fast and easy.

The Right to Control Copying

Copyright in Canada is set out in the federal *Copyright Act*. Because the *Copyright Act* is a federal statute, it applies throughout Canada. Under copyright law, unless there is permission or a licence from the owner, generally speaking, it is illegal to copy, reproduce, publish, or transmit copyright protected material. This is the law in the print world. It is also the law in the digital world. Although that is the law, the application of copyright in a digital environment is not always easy.

Why is Copyright Important to Architectural Practice in a Digital Environment?

Architects must be concerned about people using their work without permission or paying the appropriate fee. The legal term for unauthorized use is "copyright infringement." Digital technology has made copyright infringement a whole lot easier. People have long been able to photocopy plans and texts, tape-recorded music and television shows. Such "leakage", as copyright lawyers call it, has always existed. However, with digital technology, this leakage threatens to turn into a flood. For example, plans digitized into a computer file can be copied and distributed by e-mail in minutes, a dozen, or even a hundred times. Digital technology makes unauthorized copying of material protected by copyright fast and very easy. This is why knowing how the copyright law protects architects is especially important in a digital environment.

Architectural Works Are Protected by Copyright

The Copyright Act protects architectural works in a category of material called "artistic works." Artistic works are defined to include drawings, charts, plans, photographs, works of artistic craftsmanship (such as models) and architectural works. An "architectural work" is defined to mean "any building or structure or any model of a building or structure." As a result, the building is protected by copyright, as well as the various drawings, sketches, designs and models produced as part of the project.

Architects Own the Copyright in their Works

Under the *Copyright Act* an architect is an "author." Under a general rule, the first owner of copyright in a work is its author. Therefore, architects, as authors of plans, drawings, specifications, addenda and so on, are the owners of the copyright in those artistic works. There are a number of special ownership rules, one of which provides that where an author is employed, and the work is made as part of that employment, the "employer" instead of the "author" is the first owner of the copyright. The rules on ownership can be changed by agreement. For example an architect can agree that copyright will belong to the client. The copyright law requires that the agreement, or contract, be in writing.

Note: When an architectural practice engages an independent contractor (sometimes erroneously referred to as a "contract employee"), there should be agreement on the issue of copyright ownership in order to avoid future problems.

Owning a Copy Does Not Include Owning Copyright

Ownership of a physical object does not include ownership of copyright. For example, ownership of a set of plans does not mean that a client also owns the copyright in them. The plans can be owned by the client, but activities restricted by the copyright law (such as making a copy, posting the plans on a web site, or constructing a second building from the plans) still apply. The client is entitled to the use of the "instruments of service" (usually the drawings and specifications), but only on the condition that the client has paid for the services represented by the instruments of service, and then only for the purpose intended. Just because the client physically owns the plans does not mean the plans can be copied, used on a web site or used to construct another building. The legitimate needs of clients should be dealt with in a written agreement with the agreed-upon uses of the copyright protected material clearly defined.

How long does Copyright Last?

Ownership of physical property, such as a car or piece of land, continues until the property is sold, consumed, or given away. Copyright is different because it ends after periods of time set in the *Copyright Act*. Under a general rule, copyright subsists for the life of the author of the work, the remainder of the calendar year in which the author dies, plus an additional 50 years. Where an architectural work has more than one author, copyright subsists for the life of the author who dies last, for the remainder of the calendar year of that author's death, plus an additional 50 years. When copyright ends a work is said to fall into the "public domain". Everyone is free to use a public domain work without permission or paying royalties (including digital use).

What Rights Does a Copyright Owner Have?

The copyright law provides a number of legal rights. These rights permit copyright owners to control when, where, by whom and at what cost their creations can be used. There are two different kinds of rights: moral rights and economic rights.

Right of Reproduction

One of the most important economic rights an architect has under the *Copyright Act* is the sole and exclusive right to reproduce a work, or a substantial part of it, in any material form. An example of how this applies in an on-line setting is downloading. In copyright terms, downloading is making a copy. Downloaded copies are reproductions under the copyright law and require the authorization of the copyright owner. As the author, an architect has the exclusive legal right to copy specifications, drawings and addenda and is the only person who can authorize anyone else to do so.

Paper, electronic, or three dimensional models are copies in material form. Although unauthorized use is not a new concern, the ease of copying electronic documents is a major issue for architects in the digital context. However, if someone wants to use drawings without authorization or payment, they will do so whether the copy is in paper or digital form.

Right of Publication

Another right provided is the exclusive right to publish the work for the first time. The decision of whether and when to publish plans belongs to the copyright owner.

Right of Adaptation

Another right is to adapt a work from one form to another. An example which clearly illustrates this right is adapting a novel to make a movie. Architects, like novelists, have the legal right to control adaptations of their works from one form to another. For example, an architect has the right to control adaptation of plans or drawings to serve a new purpose.

Right of Electronic Distribution

Architects also have the right to control communication of their work to the public by telecommunication. This right is important for anyone using on-line distribution. When a work is transmitted on-line what happens in copyright terms is a communication to the public by telecommunication. Only the copyright owner has the legal right to communicate to the public by telecommunication, or to authorize anyone else to do so. If anyone wants to transmit an architectural work on-line, such as a client or a contractor, then they have to get the authorization of the copyright owner. For example, virtual or electronic plans rooms cannot operate unless the authorization of the copyright owner in the electronic documents is first obtained. If authorization is not obtained, an infringement will occur. When an architect owns the copyright, he controls the electronic use.

What is Copyright Infringement?

"Infringement" is the legal word for breach or violation of the rules in the copyright law. Infringement occurs when someone, without permission, does something only the copyright owner has the right to do, or to authorize. For example, only the copyright owner has the right to make a copy. When someone makes a copy, they infringe copyright because they do something only the copyright owner has a right to do.

There are consequences for breaking any law. For example, the consequence for jay walking is a ticket and for murder a jail term. Infringement of copyright law is no different. The most common consequence for copyright infringement is a court order that money be paid by a defendant as compensation for damages caused by an unauthorized use of a copyright work. There are many cases where architects have been awarded money to compensate them for the financial loss caused by the unauthorized use of their work. Another common consequence is an injunction (court order to stop infringing).

Copyright Notices

Copyright protection in Canada is automatic. Under the *Copyright Act* there is no need to register copyright in order to be protected, although there is a voluntary registration system administered by the Canadian Intellectual Property Office at Industry Canada. A copyright registration certificate entitles the registrant to presumptions on ownership and authorship which are useful in enforcing copyright against third parties.

In Canada, it is not necessary to mark a work with a notice of copyright in order for it to be protected. However, a work must be marked for it to be protected in some other countries. An international agreement called the Universal Copyright Convention provides for marking with a small "c" in a circle, the name of the copyright owner and the year of first publication. An example is "© John Doe Architect, 2001." Even though marking is not mandatory in Canada, it serves as a reminder to others that copyright exists in a work and gives the name of the copyright owner.

Trademarks and Patents

There are five types of intellectual property: copyright; patents; trademarks; industrial designs; and integrated circuit topographies. A trade mark is a word, a symbol, a design, or a combination of these, which traders use to distinguish their wares and services from those of their competitors. Trademarks are owned by, and come to represent not only actual wares or services but the reputation of the trader. Architects often have trademark rights since almost everyone that operates a business uses a trademark of one kind or another to identify his or her wares or services.

A patent gives an inventor the right to exclude others from making, selling or using an invention for a maximum of 20 years. In exchange, the inventor provides a full description of the invention so that all Canadians can benefit from the advance represented by the invention. As a general rule, patent protection is not relevant to architectural practice.

Some Practical Suggestions[1]

The practical enforcement of copyright in an online environment has many aspects. It involves the control of files and material sent via e-mail, removable media, and by downloading from host sites on the Internet. These are the general methods of transferring files between individuals, and usually lack any sort of control at either the base level, or in the distribution itself.

While it is important to explore and implement some type of copyright strategy, it is equally important to note that the single largest contributing factor to copyright infringement is general public attitude. The public's attitude toward the digital world, and particularly the Internet, is that it is essentially a "free" domain. Great resistance is offered to any person or group attempting to institute a pay-for-use system on the Internet. The recent Napster case is an example. Acquiring easily copied digital material is simply not perceived as "theft" by a vast majority of Internet users.

In this environment, control over copyright material becomes the responsibility of the copyright owner. Copyright laws exist, but unless infringement is blatant or causes enormous economic harm, as in the Napster case, enforcement will generally not occur. Infringement is rarely wildly obvious or causes the millions of dollars in economic harm that occurred in the Napster case.

From a practical perspective, there are several technological ways to minimize copyright infringement:

- a digital drawing can be bound or its layers grouped into a single layer which minimizes the usefulness of the drawing file.
- use of software, such as Adobe Acrobat, creates a graphic file that is printable and viewable, but has no direct CAD usefulness.
- files or material available for download from a web, ftp, or other accessible public site should be password-protected.
- include text in an e-mail message, with any removable media, and within the file itself, warning the user that the content of the file is protected by copyright and that copying is prohibited unless permission is obtained.

This list is by no means comprehensive, but outlines some simple steps. None of these steps wholly, or even in large part, will stop copyright infringement. However, awareness of the fact of infringement may, in the long run, prove to be of the greatest value to architects in protecting their work.

[1] Liberally adapted with permission from an article by Chris Gowling, Kasian Kennedy Architecture Interior Design and Planning.

The following documents and forms are attached:

Licence Agreement – an agreement form to be completed and used when the architect intends to permit limited use of his or her documents. The architect should ensure appropriate compensation for such a licence.

Copyright Notice –sample wording to be applied to all electronic documents.

Disclaimer –sample wording to be applied to all electronic documents.

The purpose of these forms is to assist the architect in the overall control and management of electronic documents and in the protection of the architect's copyright.

Logo or Name of Architectural Practice

Licence Agreement

Between:

_____ (the Architect)

and

_____ (the User)

WHEREAS the User has requested from the Architect, and the Architect has agreed to supply to the User, _____

_____

_____

(specify electronic document(s) e.g. specifications, drawings and addenda) **hereafter the "electronic documents."**

Therefore, the Architect and the User agree as follows:

1. The Architect retains all rights of ownership, including copyright, in the electronic documents.

2. The User agrees not to forward to others, transmit, download or reproduce the electronic documents in any format, whether print or electronic, except as expressly permitted under this agreement.

3. The Architect retains physical copies of the materials contained in the electronic documents. Where there is a conflict between the electronic documents and the physical copies, the physical copies shall govern.

4. The User agrees not to modify or alter the electronic documents in any way.

5. The User agrees not to use or reuse the electronic documents in any manner except as expressly permitted by this agreement.

6. The User agrees not to resell, trade, or distribute the electronic documents without cost.

7. The User agrees to review all the documents related to the User's work. If the User does not review a complete set of documents, the User agrees that the risks and consequences of any review are the sole responsibility of the User.

8. The Architect authorizes to User to

   _____

   _____

   (specify uses: eg. to prepare shop drawings, to apply for a building permit, for construction, for tender purposes, to prepare engineering drawings, for renovations or additions etc.)

9. The User agrees that the Architect is not responsible, or liable, in any way for the use of the electronic documents by the User or by anyone receiving the electronic documents from the User, other than the use(s) authorized under this agreement.

10. The Architect expressly disclaims all representations and warranties of any kind, express or implied, in connection with the electronic drawings.

11. Except for any liability which cannot by law be excluded or limited, the Architect shall not be liable to anyone for any direct or indirect damages arising from any errors or omissions, completeness of the electronic documents, misuse of the electronic documents, any errors in its computer system, in the software used therewith, or in the electronic files, or for any lost profits, special or consequential damages for any claim arising out of the use of, or inability to use, the electronic files.

12. The User agrees that use of the electronic documents is at the User's own risk. The User agrees to indemnify and save harmless the Architect, his/her employees, agents and consultants from and against all claims, losses, demands, costs and expenses (including legal fees), damages or recoveries (including any amounts paid in settlement) arising by reason of, caused by, or alleged to be caused by, the User's reliance on the electronic document.

By proceeding to open this file the User agrees to be bound by the terms of this agreement.

Copyright Notice

Copyright in this electronic document belongs to _____. This electronic document may not be forwarded to others, transmitted, downloaded or reproduced in any format, whether print or electronic, without the express, written permission of the copyright owner.

Disclaimer

Use of this electronic document is at the User's own risk. The User shall indemnify and save harmless the Architect, his/her employees, agents and consultants from and against all claims, losses, demands, costs and expenses (including legal fees), damages or recoveries (including any amounts paid in settlement) arising by reason of, caused, or alleged to be caused, by the User's reliance on this electronic document.

Checklist: Internal Review of Drawings

Notes
Refer to the recommended checking procedure on page 9 in Chapter 2.1.9 *Risk Management and Professional Liability*, **which should be followed rigorously.** The primary purpose of this Checklist is **Quality Assurance.** Checking should commence early in the preparation of working drawings and continue throughout their development. Adjust review process to suit the type/size of project.

Refer also to *Checklist: Life Safety Information to Include on Drawings* which deals with Building Code issues, most of which are not repeated here. Life Safety issues should be applied during the design stages and verified early in the review process.

This Checklist is arranged under the titles of the drawings on which the information to be reviewed would normally be placed. Depending on scope/complexity of project, architectural plans may include:

- **Site Plan** *may be divided into separate drawings, each showing selected information*
- **Landscaping Plan** *may be prepared by landscape architect*
- **Exit Analysis Plan(s)** *information may be shown on Key Plan(s) for smaller buildings*
- **Key Plan(s)** *small scale location/reference plan(s) showing each floor level in its entirety; see below*
- **Foundation Plan** *required if building has no basement*
- **Floor Plan(s)** *larger scale general information plans; may be a segment, only, of its floor level; see below*
- **Roof Plan** *see below*
- **Reflected Ceiling Plan(s)** *may be a segment, only, of its floor level; see below*
- **Detailed Plan(s)** *of specific areas, as required*

Refer also to the outline of drawing information found in Chapter 2.3.7 *Construction Documents - Drawings:* follow recommendations on page 7 for Notes, Symbols and Dimensions.

As a general principle, notes and dimensions should be placed in the most significant location in the documents and **not repeated** elsewhere, in order to minimize the risk of unrevised, and probably contradictory, information being left on other drawings.

This Checklist is limited to information which is shown/detailed on drawings. Some cross-references to specifications are provided, where appropriate. Items which are the primary responsibility of the appropriate consulting engineers are noted under relevant drawing titles as a reminder to the architect to review them and verify that there are no conflicts between architectural and engineering drawings.

Comments, clarifications or recommendations are in *italics*
Use of a forward slash (/) signifies *and* or *or*

General

Title Block

- ❑ project name/address *same on all drawings, including drawings prepared by consultants*
- ❑ project number
- ❑ date *same date on all drawings, including drawings prepared by consultants*
- ❑ drawing (sheet) title
- ❑ drawing (sheet) number
- ❑ scale of plot or paper copy *additional graphic scale on any drawings which may be reduced*
- ❑ name or initials of draftsperson
- ❑ north point *on relevant drawings only (Site Plan, Key Plan, Floor Plans, etc)*
  - 'project north' point *if the angle of the building on the site is such that the orientation of a side is not readily apparent*
- ❑ location diagram with portion of building plan cross-hatched showing which part of floor is on sheet *required only if entire building plan, when drawn at appropriate scale, will not fit on one sheet*
- ❑ electronic file name and number/date of plot

Cover Sheet *(optional)*

- ❑ project name
- ❑ project location *small-scale partial map of community with location of project marked/ placed on Site Plan sheet if cover sheet not used*
- ❑ list of drawings *in specifications if cover sheet nor used*
- ❑ **building code data** *placed on Site Plan sheet if cover sheet not used:*
  - project regulated by Part 3, 9 or 11
  - major occupancy
  - building area/gross area *(m^2),including:*
    - existing
    - new
    - total
  - number of storeys:
    - above/below grade
  - height of building *(m)*
  - number of streets/fire access routes
  - building classification
  - sprinkler system
  - standpipe
  - fire alarm
  - high building
  - permitted/actual construction, including:
    - combustible
    - non-combustible
    - both
  - mezzanine(s) area *(m^2)*
  - occupant load based on:
    - m^2 per person
    - design of building
    - *listed by floors, including basement level(s)*
    - *verify total number of occupants for each floor against numbers shown on Key Plan*
  - hazardous substances
  - required fire resistance ratings for:
    - horizontal assemblies
    - supporting members
    - *listed design numbers*
  - spatial separation/construction of exterior walls *details for each side of building, including:*
    - area of exposed building face *(m^2)*
    - limiting distance *(m)*
    - length/height or height/length ratio *(m)*
    - permitted maximum/proposed % of openings
    - fire-resistance rating
    - listed design or description:
      - combustible
      - non-combustible
      - combination
- ❑ **other data** ***as required by Authorities Having Jurisdiction*** *placed on Site Plan sheet if cover sheet not used, including:*
  - calculations of:
    - occupancy
    - number of washroom fixtures required
    - parking
  - seismic design conditions
  - barrier free provisions

Site Plan

Note stating data taken from survey plan/other information provided by client, including surveyor's name and drawing title/number/date and a further note stating source(s) of other information. Check all existing information against sources and ensure same orientation as floor plans

- ❑ site boundaries, including:
  - dimensions/orientation of property lines
  - angles at intersections
- ❑ rights-of-way/easements
- ❑ zoning setback lines and other regulatory conditions
- ❑ benchmark:
  - actual (geodetic) elevation
  - assumed (convenience) elevation
- ❑ borehole locations *borehole logs not shown on drawings, but available in geotechnical report referenced in specifications*
- ❑ legend indicating symbols for existing/ new levels

existing conditions:

- ❑ levels/elevations, including:
  - contour lines/spot elevations
  - top/bottom at abrupt changes in level
  - crown of street(s)/top & bottom of curbs
- ❑ ditches/swales/water courses/ponds
- ❑ catch basins/fire hydrants/maintenance access covers
- ❑ existing buildings/fences/poles/buried services, including:
  - on site
  - adjacent to site
  - existing buildings to be retained
- ❑ paving, including:
  - sidewalks/paved areas/driveways/ curbs/curb cutouts
- ❑ vegetation, including:
  - species/caliper of trees greater than 100mm
  - shrubbery

new construction:

- ❑ building location, including:
  - dimensions from property lines
  - main floor level:
    - geodetic elevation or
    - relative to benchmark
- ❑ differentiation between existing/new for addition/renovation projects by cross-hatching/shading
- ❑ limits of construction
- ❑ location of temporary shoring
- ❑ grading/earthwork:
  - proposed levels/elevations *some of this information may appear on landscape architectural drawings or civil engineering drawings*
- ❑ landscaping, including:
  - existing planting/trees to be removed/retained/protected
  - proposed *new landscaping may be developed later by landscape architect*
  - cross-check against landscape architecture drawings
- ❑ site works, such as:
  - paving:
    - materials
    - dimensions *including unobstructed distance from road/driveway to hydrant/fire department connection*
    - direction of slopes
    - parking areas/roads
    - fire access route(s)
    - extent of light/medium/heavy duty asphalt
    - parking lot layout/painted lines
  - sidewalks/curbs/ramps, including:
    - materials
    - dimensions
    - direction of slopes
  - other construction, with dimensions *as required:*
    - concrete pads for transformers/air conditioning condenser
    - oil tank
    - septic tank/disposal bed
    - well
    - fencing/walls/garbage enclosure/hoarding
  - surface water drainage, such as:
    - ditches/swales/catch basins
    - flood control/containment/confined areas/other environmental protection
    - siltation control devices
- ❑ site servicing information, with dimensions *as required:*
  - *some or all of this may be shown on engineering drawings*
  - system of foundation drainage
  - catch basins/fire hydrants/maintenance access covers
  - utilities and other service connections
  - site lighting
  - pad-mounted transformers
  - cross-check against engineering drawings
- ❑ site details *cross-referenced to other drawings*

Key Plan(s)

Information noted should be shown on Floor Plans if Key Plans not used

- ❑ outline plan of each floor level:
  - differentiation between existing/new for addition/renovation projects *by cross-hatching/shading*
  - location of building cross-sections *cross-referenced to other drawings*
  - all doors with swings *not necessary to show windows*
  - ramps/stairs, with up/down arrows
  - toilet partitions/plumbing fixtures
  - names/identifying numbers of all interior spaces
  - structural grid lines *with reference symbols*
  - primary dimensions:
    - exterior overall
    - column centres
    - verify total of individual dimensions against overall *if complete dimension runs are used*
  - legend/graphic indication of locations

and fire-resistance ratings of all firewalls/fire separations
- number of occupants indicated, assigned to each:
  - exit stair/ramp/exit door to exterior
  - horizontal exit
  - exit door from hazardous rooms/high occupant load areas when occupant load exceeds prescribed number
  - door dividing corridor leading to an exit
  - cross-check total number of occupants for each floor against occupant loads listed in building code data

Demolition Plans *for renovation projects*

- ❑ outline plan of each level showing work to be:
  - demolished
  - underpinned/shored
  - renovated
  - retained
- ❑ specific items numbered/dotted/cross-hatched/shaded *with legend(s) describing work required*

Floor Plans

*Incorporate **all** items noted under Key Plans if Key Plans not used*

- ❑ outline plan of each level: use same orientation for all floor plans and match line *when floor plan divided into segments shown on separate drawing sheets*
- ❑ differentiation between existing/new for addition/renovation projects *by cross-hatching/shading*
- ❑ locations of plan details/interior wall elevations *cross-referenced to other drawings/ ensure all conditions requiring clarification are detailed*
- ❑ structural grid lines *with reference symbols*
- ❑ expansion joints:
  - locations
  - uninterrupted throughout entire building
- ❑ exterior walls/interior partitions/walls:
  - partial-height partitions/walls *differentiated/noted*
- ❑ floor slopes/depressions/trenches
- ❑ location of changes in flooring materials
- ❑ doors with swings/windows/other openings:
  - door sizes/types/fire protection ratings *if door schedule not used*
  - door numbers *cross-referenced to door schedule*
  - cross-check openings against elevations
- ❑ piers/columns
- ❑ dotted footings to walls/piers/columns *on basement or foundation plan*
- ❑ names/identifying numbers of all interior spaces
- ❑ ramps/stairs, with up/down arrows
- ❑ toilet partitions/plumbing fixtures
- ❑ dimensions:
  - overall wall thicknesses *not necessary to dimension each element in walls if wall assembly types identified by reference numbers*
  - partitions
  - locations of windows/doors/other openings

  showing overall dimensions as required
  - verify total of individual dimensions against overall *if complete dimension runs are used*
  - cross-check against other plans/details at different scales *refer also to Notes*
  - cabinetwork *if interior elevations not used*
- ❑ wall components delineated:
  - masonry wythes/cavity
  - insulated metal wall systems
  - EIFS/drywall/cladding to stud walls
  - *no cross-hatching of each element if wall assembly types identified by reference numbers*
- ❑ wall assembly types identified by reference numbers:
  - *W1, W2, etc. for exterior walls; P1, P2, etc. for interior partitions*
  - schedule giving thickness/material of each component of each wall type *preferably on same drawing*
  - cross-check that terminology/abbreviations used for materials same as in specifications
  - every wall identified by appropriate reference number
- ❑ outlines of cabinetwork
- ❑ other work:
  - concrete bases for mechanical/electrical equipment
  - manufactured items:
    - panel folding doors
    - washroom accessories
    - prefabricated shelving
- ❑ engineer-designed items:
  - dimensions *only to items requiring precise locations*
  - structural:
    - columns

- mechanical:
  - vertical ducts/duct shafts/pipe spaces
  - built-in/semi-recessed/surface mounted components
  - plumbing fixtures
  - piping requiring chases
  - major equipment
- electrical:
  - panels
  - other built-in/semi-recessed/surface-mounted components
  - major equipment
- cross-check against engineering drawings

Roof Plan

Same orientation as floor plans and match line when roof plan divided into segments shown on separate drawing sheets

- ❑ differentiation between existing/new for addition/renovation projects *by cross-hatching/shading*
- ❑ locations of plan details *cross-referenced to other drawings*
  - *ensure all conditions requiring clarification are detailed*
- ❑ structural grid lines *with reference symbols*
- ❑ type of roofing:
  - roof assembly types identified by reference numbers: *R1, R2, etc.*
  - schedule giving thickness/material of each component of each type *preferably on same drawing*
  - cross-check that terminology/abbreviations used for materials same as in specifications
- ❑ slope directions
- ❑ drains/sumps/scuppers/gutters
- ❑ roof pads/curbs/anchors/ladders/guard rails
- ❑ curbs at roof access doors
- ❑ parapets/low rise walls/screens
- ❑ access hatches/skylights
- ❑ vents/chimneys
- ❑ roof walkways
- ❑ roof-mounted mechanical/electrical equipment
- ❑ dimensions only to items requiring precise locations
- ❑ cross-check against engineering drawings

Reflected Ceiling Plans

Same orientation as floor plans and verify match with most recent floor plans and match line when ceiling plans divided into segments shown on separate drawing sheets

- ❑ ceiling types *cross-referenced to finish schedule, using same terminology/abbreviations*
- ❑ ceiling/bulkhead levels
- ❑ layout/alignment of ceiling suspension grid(s)
- ❑ bulkheads:
  - cross-referenced to detail drawings *preferably located on same sheet*
- ❑ light fixtures:
  - surface-mounted
  - recessed
- ❑ supply diffusers
- ❑ return air grilles
- ❑ detectors:
  - heat/smoke
  - carbon monoxide
- ❑ sprinkler heads
- ❑ other equipment such as speakers, etc.
- ❑ legend(s) *showing symbols/notes used*
- ❑ cross-check against mechanical/electrical drawings

Building Sections

Each section identified by reference number verify cross-references to location drawings

- ❑ all building components that intersect with section:
  - *interior elevations showing cabinetwork if not detailed/shown elsewhere*
- ❑ match line *when sections divided into segments*
- ❑ differentiation between existing/new for addition/renovation projects *by cross-hatching/shading*
- ❑ locations of wall details *cross-referenced to other drawings*
  - *ensure all conditions requiring clarification are detailed*
- ❑ verify that window/door openings match elevations
- ❑ levels/elevations:
  - finish floor *for each floor level*
  - roof bearing at walls
  - grade at building
  - bottom of footings
- ❑ structural grid lines *with reference symbols*
- ❑ vertical dimensions:
  - floor to floor
  - floor to roof *taken to same point as shown on large-scale wall details*
  - floor to top of parapets
  - window openings
  - interior openings/glazed screens

- ❑ legend/graphic indication of locations and fire-resistance ratings of all firewalls/ fire separations:
  - firewalls continuous from ground to/ through roof:
    - may terminate at underside of reinforced concrete roof slab
    - parapet height as required by fire-resistance rating of firewall
  - wall fire separations continuous elements from floor up through ceiling space to underside of structure above including exceptions where fire-resistance rating waived, but walls still required to be constructed as fire separations (when separation falls under steel joists/beams, continuity maintained by rated enclosure of joists/sprayed fireproofing on beams *or other means)*
  - floor/roof assembly fire separations
- ❑ wall/roof assembly types identified by reference numbers *cross-referenced to drawings where schedules placed*
- ❑ structural:
  - footings
  - special foundations *usually shown only partially*
  - joists/beams/lintels/rafters/roof trusses
  - in section
  - in elevation *if beyond*
- ❑ heating/ventilating/air conditioning:
  - main horizontal ducts
  - major equipment: in elevation *if beyond*
- ❑ cross-check against engineering drawings

Elevations

If building form is complex, parts of elevation identified by letter or number on location diagram in title block and match line when elevations divided into segments

- ❑ all building faces:
  - below-grade foundation walls/ footings *dotted*
  - line of grade at building face
- ❑ differentiation between existing/new for addition/renovation projects
- ❑ locations of:
  - wall details
  - plan details - ***only*** *if required to augment/clarify notations on Key Plan/Floor Plans/Building Sections*
- ❑ *cross-referenced to other drawings*
  - *ensure all conditions requiring clarification are detailed*
- ❑ verify that window/door openings match building sections
- ❑ openings/penetrations:
  - doors/windows/grilles/vents/fire fighting access panels
  - dimensions to intermediate mullions for door frames/windows *or*
  - reference numbers for each door frame/window type *cross-referenced to drawings where large-scale elevations placed*
- ❑ attachments:
  - light fixtures/receptacles/siamese connections/signage/downspouts/ flagpoles/etc.
- ❑ structural grid lines *with reference symbols*
- ❑ locations of interior/hidden levels:
  - floors
  - finish floor level/elevation *for each floor level*
  - flat roofs behind parapets
- ❑ vertical dimensions:
  - to doors/windows/other important items requiring location
  - floor to floor or floor to roof *when not shown on Building Sections*
- ❑ exterior construction materials:
  - graphically/notations -cross-check that terminology/abbreviations used for materials same as in specifications
  - masonry control joints
  - expansion joints
- ❑ roof-mounted mechanical equipment *which affects appearance of building*
- ❑ cross-check against engineering drawings

Details

wall sections

- ❑ each section identified by reference number/scale *verify cross-references to location drawings*
- ❑ all building components that intersect with section shown:
  - cross-hatching/symbols to indicate materials, plus notations, including location/material of air/vapour barriers or
  - wall/roof assembly types identified by reference numbers *cross-referenced to drawings where schedules placed*
  - section continuous from footing to roof
  - typical window or door condition
    - verify that window/door openings match building sections
  - fire stops in concealed spaces

- backfill line, including foundation drainage/backfill layers
- special drainage

❑ column line - dimensioned to wall face(s)
❑ vertical dimensions
❑ structural:
- reinforcing in footings/anchor bolts *when not shown on structural drawings*
- joists/beams/lintels/rafters/roof trusses

❑ cross-check against engineering drawings

large-scale details of building envelope/assembly conditions

ensure all conditions requiring clarification are detailed

❑ vertical/horizontal
❑ each detail identified by reference number/scale *verify cross-references to location drawings*
❑ vertical section details:
- wall/floor intersections
- window sills
- window/door heads
- curtain wall
- wall/roof intersections
- roof details:
  - curbs/expansion joints
  - skylights

❑ horizontal section details:
- corners
- intersections with columns/partitions
- window/door jambs

❑ notations:
- levels/elevations, including:
  - floor/roof
  - structural bearing for joists/beams
- wall/roof assembly types identified by reference numbers *cross-referenced to drawings where schedules placed*
- assemblies not covered by reference numbers *fully noted*
- cross-check that terminology/abbreviations used for materials same as in specifications
- through-wall flashings
- air/vapour barriers:
  - continuity
  - laps/seals to adjoining barrier materials/assemblies
- all dimensions *not already shown on Plans/Building Sections/Elevations:*
  - vertical/horizontal
  - key measurement points identified *for cross-reference to location drawings*

detailed floor plans/associated interior elevations

Ensure all areas requiring clarification are detailed. Provide plan blow-ups of complex areas.

❑ verify accuracy against most recent floor plans
❑ each plan/detail identified by reference number/scale *verify cross-references to location drawings*
❑ detailed dimensions
- no duplication of information on floor plans

❑ materials/accessories:
- special floor finish layouts/patterns/details
- custom-fabricated items
- manufactured specialties
- cross-check that terminology/abbreviations used for materials same as in specifications

❑ cross-referenced to detail drawings for:
- wall elevations *preferably on same sheet for ease of reference when specific to detailed plan*
- installation details
- custom-fabricated items

interior elevations

Ensure all areas requiring clarification are detailed.

❑ each elevation/detail identified by reference number/scale *verify cross-references to location drawings*
❑ interior wall elevations:
- elevations of cabinetwork
  - locations of sections *cross-referenced to cabinetwork details*
- other wall-mounted items
- glazed screens/interior windows/openings
- special equipment
- panel folding doors/walls
- paneling
- grilles/louvres/thermostats/other mechanical items
- switches/receptacles/electrical panels
- *cross-referenced to details*

❑ dimensions:
- horizontal dimensions to cabinetwork
- vertical dimensions to locate wall-mounted items
- locations/areas for wall finishes/paneling

❑ cross-check that terminology/abbreviations used for materials same as in schedules/specifications
❑ cross-check against mechanical/electrical drawings

window/door details

Ensure all areas requiring clarification are detailed.

- ❑ each elevation/detail identified by reference number/scale *verify cross-references to location drawings/details*
- ❑ dimensioned elevation of each type of:
  - window
  - aluminum entrance/sidelight/storefront
  - door *including glazing/grilles as required*
  - hollow metal door frame/screen
  - cross-check overall dimensions against dimensions on Plans/Building Sections/Elevations
  - *cross-referenced to large-scale details*
- ❑ notations:
  - glazing:
    - *same terminology/abbreviations as specifications*
    - glass type
    - glazing components
  - frame materials
  - grilles
- ❑ large-scale details, including:
  - window frames/opening vents
  - curtain wall
  - aluminum entrances/sidelights/screens
  - hollow metal frames/screens
  - special fabrications
  - cross-referenced to elevations

stair/ramp details

ensure are all conditions requiring clarification are detailed

plans:

- ❑ stairs/ramps:
  - widths/lengths
  - landings/clearances to doors
  - slip-resistant surfaces
  - demarcation by colour/pattern in floor surfaces:
    - leading edge of treads/landings
    - beginning and end of ramps
- ❑ handrails:
  - continuous on both sides of stairway *including landings when required*
  - termination:
    - no obstruction to pedestrian travel
    - not hazardous
    - at least one handrail extended horizontally beyond top and bottom of stairway/ramp

cross-referenced to large-scale details

sections:

- ❑ stairs:
  - leading edge of treads radiused/beveled
  - uniform run/rise in any one flight
  - no significant alteration in run/rise in successive flights
  - maximum vertical rise of flights between floors/landings not exceeded
  - minimum headroom clearance maintained
  - *check floor to floor heights against Building Sections*
- ❑ ramps:
  - slopes indicated
  - landings/level areas adjacent to doors
- ❑ guards:
  - height
  - limited opening sizes through guards
  - designed to prevent climbing
  - *cross-referenced to large-scale details*
- ❑ dimensions:
  - tread/riser
  - horizontal/vertical
  - landings
  - height of handrails/guards
- ❑ large-scale details:
  - typical tread/riser
  - custom-fabricated items
  - special conditions
  - *cross-referenced to plans/sections*

elevators/escalators

Ensure all areas requiring clarification are detailed

- ❑ cross-check against specified manufacturers' dimensions/details *Note: it is not recommended to reproduce manufacturers' proprietary details*
- ❑ plans:
- ❑ elevator:
  - pit(s)
  - shaft(s) showing door openings
- ❑ escalators:
  - floor openings
- ❑ elevator machine room:
  - shaft(s) below dotted *cross-referenced to details*

sections:

- ❑ vertical section(s) through elevator shaft(s)/escalators showing:
  - pit
  - all floors
  - elevator machine room
  - *check floor to floor heights against Building Sections*

dimensions:

- ❑ plan location(s) *relative to structural grid lines*
- ❑ pit:
  - depth
  - width/length
- ❑ shaft:
  - width/length
  - openings
  - floor to floor
  - top landing to machine room floor
- ❑ machine room:
  - width/length
  - placement relative to shaft(s)
- ❑ escalator floor openings

details:

- ❑ access ladders/stairs
- ❑ custom fabricated items
- ❑ *cross-referenced to plans/sections*

cabinetwork

Ensure all areas requiring clarification are detailed

- ❑ each detail identified by reference number/scale *verify cross-references to interior elevation drawings*
- ❑ cross-check services/spaces for Owner-provided appliances/equipment
- ❑ cross-check against mechanical/electrical drawings:
  - sinks/fittings
  - water lines/laboratory services
  - drains/vents/grease interceptors
  - switches/receptacles/turrets
  - access panels

detail sections for each cabinet condition

dimensions:

- ❑ vertical/horizontal
- ❑ splashback height
- ❑ toe space height/depth
- ❑ countertop overhang

notations:

- ❑ generic *sufficient to identify materials: specifications provide detailed descriptions*
- ❑ cross-check that terminology/abbreviations used for materials same as in specifications
- ❑ splashback returns
- ❑ adjustable shelves
- ❑ special items

millwork/miscellaneous details

Ensure all areas requiring clarification are detailed

- ❑ each detail identified by reference number/scale *verify cross-references to interior elevation/other drawings*
- ❑ large-scale details of all custom-fabricated items
- ❑ fully dimensioned
- ❑ generic notations *sufficient to identify materials: specifications provide detailed descriptions*
  - cross-check that terminology/abbreviations used for materials same as in specifications

Schedules

doors & frames

Include every door in Schedule

- ❑ *verify cross-references to Floor Plans*
- ❑ cross-check that terminology/abbreviations used for materials same as in specifications

verify scheduled description for each door:

- ❑ location
- ❑ swing (hand)
- ❑ dimensions
- ❑ material
- ❑ glazing material *same terminology as specifications*
- ❑ fire protection rating:
  - *check against fire separations on Key Plan/Floor Plans*
- ❑ frame:
  - material
  - wall thickness
  - *cross-referenced to door frame elevations/details*
- ❑ hardware sets
- ❑ special hardware requirements:
  - closers
  - panic devices
  - electromagnetic hold-open devices
  - electromagnetic locking devices
  - automatic openers
  - weatherstripping

room finishes

Include every surface in every room in Schedule

- ❑ *verify cross-references to Floor Plans*
- ❑ verify scheduled description for each room:
  - floors: material
  - base: material
  - each side of room listed separately
  - wall material
  - finish

notations in remarks column for:

- alcoves
- closets
- columns
- unusual configurations

- ceilings:
  - material
  - height *check against Building Sections*
- remarks
- legend *explaining abbreviations used*
  - cross-check that terminology/abbreviations used for materials same as in specifications

Structural

- *same orientation as floor plans*
- verify match with most recent architectural floor plans:
  - same match lines as architectural floor plans *when used*
  - structural grid lines
  - expansion joints
- demolition plans for renovation projects showing work to be:
  - demolished
  - underpinned/shored
  - renovated
  - retained
- cross-check dimensions of concrete footings/walls/slabs/beams against Floor Plans/Sections
- floors:
  - depressions/trenches
  - slopes
  - sawcuts
  - special finishes
- columns:
  - orientation of rectangular/H sections
  - dimensions consistent with space available
- roofs designed to support weight of retained water when restrictor roof drains specified
- exposed structural steel:
  - continuous welds
  - welds ground
- miscellaneous structural items:
  - anchors:
    - provision for masonry anchorage to steel columns
    - lateral support to masonry walls
  - additional framing to support roof-mounted mechanical equipment
  - shelf angles
  - loose lintels *usually scheduled*
  - reinforced concrete block masonry:
    - piers
    - bond beams
    - walls
- cross-check roof slopes against Building Sections
- check opening sizes/associated framing against architectural/mechanical/electrical drawings, including:
  - through floors/roof:
    - exit shafts
    - duct shafts
    - elevator/escalator shafts
    - skylights
    - hatches
  - through walls:
    - large architectural openings
    - air supply/exhaust louvres
    - ducts through poured concrete walls
- cross-check clearances available in ceiling spaces between beams/suspended ceilings against mechanical/electrical items:
  - ducts
  - heat pumps/VAV units/fan coil units/etc.
  - sprinkler lines
  - roof drains
  - recessed light fixtures
  - cable trays
  - duct banks
- ensure there are no general notes on drawings duplicating information in specifications

Mechanical

- *same orientation as floor plans*
- verify match with most recent architectural floor plans:
  - names/identifying numbers of all interior spaces
  - same match lines as architectural floor plans *when used*
- cross-check locations of mechanical site work items against Site Plan:
  - foundation drainage
  - catch basins/fire hydrants/maintenance access covers
  - utilities and other service connections
- demolition plans for renovation projects showing work to be:
  - demolished
  - renovated
  - retained
- cross-check locations of mechanical items against Floor Plans/Building Sections/ interior elevations:
  - fire dampers in all ducts penetrating fire separations

- no duct penetrations through exit stairway/ramp walls
- vertical ducts/duct shafts/pipe spaces
- built-in/semi-recessed/surface mounted components:
  - no recessed items in fire separations
- floor drains
- hose bibbs
- plumbing fixtures/fixture types
- major equipment
- standpipes:
  - hose connections on each storey of building
  - fire department connection
- fire hose cabinets:
  - fully opened door does not obstruct required exit width
- portable fire extinguishers

❑ cross-check all roof-mounted items against Roof Plan:
- drains/scuppers/gutters:
  - check against structural for conflicts between roof drains/beams
- vents/chimneys
- equipment

❑ cross-check clearances available in ceiling spaces between structural beams/ceiling heights against:
- ducts
- worst-case situations:
  - duct crossings
  - allowances for duct insulation/ fireproofing on steel beams/clearances for support framing for wide ducts
  - beams at ceiling level *for example, folding wall support beam*
  - horizontal piping
  - recessed light fixtures
- heat pumps/VAV units/fan coil units/etc.
- sprinkler lines
- roof drains
- electrical items

❑ cross-check all ceiling-mounted items against Reflected Ceiling Plans:
- skylight openings
- supply diffusers
- return air grilles
- fire stop flaps in rated membrane ceiling assemblies
- detectors:
  - heat/smoke
  - carbon monoxide
- sprinkler heads

❑ cross-check against structural drawings for conflicts between:
- drain inverts/footings
- columns within plumbing chases/horizontal piping/vents
- roof drains/beams/columns

❑ cross-check against electrical drawings/schedules for horsepower ratings/voltage/phase for major equipment items

❑ ensure there are no general notes on drawings duplicating information in specifications

Electrical

❑ *same orientation as floor plans*

❑ verify match with most recent architectural floor plans:
- names/identifying numbers of all interior spaces
- same match lines as architectural floor plans *when used*

❑ cross-check locations of electrical site work items against Site Plan:
- underground utilities
- lighting poles
- pad-mounted transformers

❑ demolition plans for renovation projects showing work to be:
- demolished
- renovated
- retained

❑ cross-check locations of electrical items against Floor Plans/Elevations/ interior elevations:
- no penetrations through exit stairway/ramp walls
- panels
- central alarm and control facility
- built-in/semi-recessed/surface-mounted components:
  - no recessed items in fire separations
- interior/exterior wall-mounted light fixtures/illuminated signage/ switches/receptacles:
  - door swings/switch locations
  - cabinetwork/receptacle mounting height
- manual pull stations
- major equipment

❑ cross-check roof-mounted electrical equipment against Roof Plan

❑ cross-check clearances available in ceiling spaces between structural beams/ceiling heights against:
- recessed fixtures

- cable trays
- duct banks
- mechanical items

❑ cross-check all ceiling-mounted items against Reflected Ceiling Plans:
- skylight openings
- mechanical items
- light fixtures:
  - surface-mounted
  - recessed
  - check fixture types against electrical specifications
  - exit
- detectors:
  - heat/smoke
  - carbon monoxide
- exit signs:
  - visible from exit approach
  - over exit doors
  - additional signs to indicate direction of egress
- alarm signals:
  - audible devices located to be clearly audible throughout floor area served
  - visual devices located to be visible throughout floor area served

❑ cross-check against mechanical drawings/ schedules for horsepower ratings/voltage/ phase for major equipment items

❑ ensure there are no general notes on drawings duplicating information in specifications

Checklist: Life Safety Information to Include on Drawings

Notes
Life safety information in this Checklist is arranged under the titles of the drawings on which the information would normally be placed. Basic information required to determine type of construction, fire-resistance ratings and fire separations is listed under **General**. The arrangement of information is suggested only; the architect should modify where information is placed to suit the requirements of documenting the particular project. This Checklist is limited to information which is shown or detailed on drawings; it does not include items which are normally included in the specifications.

Some items are the primary responsibility of the appropriate consulting engineers. These items are noted under relevant drawing titles as a reminder to the architect to coordinate and verify that the information is shown on relevant engineering drawings.

Comments, clarifications or recommendations are *in italics*.
Use of a forward slash (/) signifies *and* or *or*
"as prescribed" indicates that relevant/more detailed requirements should be reviewed in the applicable Building Code or other regulations of Authorities Having Jurisdiction

General

building fire safety

prescribed combustible/non-combustible construction and fire-resistance ratings/fire separations for floor/roof/supporting assemblies, based on:

- ❑ occupancy classification
- ❑ building area
- ❑ number of storeys
- ❑ number of facing streets -number of streets determined *as prescribed*
- ❑ whether building sprinklered/unsprinklered:
  - exceptions for roof construction for sprinklered buildings *as prescribed*:
    - fire-resistance rating waived
    - heavy timber roof/supporting structure permitted
  - requirements for buildings containing multiple major occupancies based on:
  - building area/height of entire building
  - most restricted major occupancy
  - *some combinations of occupancies prohibited*
  - exception if floor area occupied by a major occupancy less than prescribed % of storey
- ❑ separations between major occupancies *as prescribed* when:
  - adjacent horizontally
  - one entirely above another
- ❑ basements:
  - floor assembly above basement designed as fire separation *as prescribed*
  - basement storage garages:
    - sprinklered, except for open-air storeys
    - may be considered as a separate building when:
      - garage sprinklered
      - walls/floor and roof above designed as fire separations
      - wall openings without closures separated from storey above
- ❑ exterior balconies:
  - areas/dimensions *as prescribed*
  - construction same fire-resistance rating as required for occupancy classification of building
  - fire protection not required on steel members outside exterior wall

building code data

may be placed on Site Plan or cover sheet:
[Ontario architects refer to OAA Practice Bulletin A.9, April 2002]

- ❑ project regulated by Part 3, 9 or 11
- ❑ major occupancy
- ❑ building area/gross area *(m^2)*:
  - existing
  - new
  - total
- ❑ number of storeys: above/below grade
- ❑ height of building *(m)*
- ❑ number of streets/fire access routes
- ❑ building classification
- ❑ sprinkler system as proposed
- ❑ standpipe *as required*
- ❑ fire alarm *as required*
- ❑ high building
- ❑ permitted/actual construction:
  - combustible
  - non-combustible
  - both
- ❑ mezzanine(s) area *(m^2)*
- ❑ occupant load based on:
  - m^2 per person
  - design of building
  - *list by floors, including basement level(s)*
- ❑ hazardous substances
- ❑ required fire resistance ratings
  - horizontal assemblies
  - supporting members
  - *indicate listed design numbers*
- ❑ spatial separation/construction of exterior walls
  provide details for each side of building, including:
  - area of exposed building face *(m^2)*
  - limiting distance *(m)*
  - length/height or height/length ratio *(m)*
  - permitted maximum/proposed % of openings
  - fire-resistance rating
  - listed design or description
    - combustible
    - non-combustible
    - combination

Site Plan

- ❑ access for fire fighting: access route(s) to principal entrance/each building face having access openings for fire fighting:
  - within prescribed unobstructed distance from hydrant/fire department connection
  - *required for buildings over 3 storeys in height or greater than prescribed building area*
- ❑ access route(s) designed to:
  - prescribed clear width/radius/overhead clearance/gradient
  - support expected loading
  - have turnaround facilities
  - be connected with a public thoroughfare
- ❑ water supply:
  - hydrants within prescribed distance from every side of building required to face a street
  - provision of adequate supplemental water supply for fire fighting if municipal supply inadequate or unavailable
- ❑ above ground electrical conductors:
  - conform to prescribed clearances from building

Key Plan(s) *recommended*

Show information on Floor Plans if Key Plans not used

Indicate locations and fire-resistance ratings of all:

- ❑ firewalls
- ❑ fire separations required between public corridors and adjacent suites/floor areas, between adjoining suites or *enclosing*:
  - in assembly occupancies:
    - hazardous classrooms: fire separation required for perimeter walls *only* around a group of hazardous classrooms/complementary ancillary rooms *as prescribed*
    - seating areas/stages and ancillary spaces *as prescribed*
    - library book storage rooms not normally accessible to the public
  - in care/detention occupancies:
    - sleeping rooms *as prescribed*: fire separation required for perimeter walls *only* around a group of intercommunicating rooms having fewer than prescribed number of occupants
    - between fire compartments *including those used for horizontal exiting*
    - compartments from which it is impractical to move patients in an emergency
    - contained use areas *as prescribed*
  - in residential occupancies:
    - between suites
      - storage rooms not within suites *as prescribed*

- in industrial occupancies:
  - repair/storage garages *as prescribed*
  - vestibules between storage garages/other occupancies
- in service rooms *as prescribed*:
  - containing fuel-fired appliances/ incinerators/oxygen cylinders
  - mechanical equipment other than fuel fired
  - electrical equipment vaults
  - janitor's/laundry rooms
  - combustible refuse storage
  - elevator machine rooms
- in rooms containing water closets/lavatories
- in vertical service shafts *as prescribed*:
  - exit stairways/elevator/ dumbwaiter shafts
  - linen/refuse chutes: intake/ discharge rooms
  - separations at top/bottom of shafts

❑ exceptions in sprinklered buildings for certain occupancy classifications *for example:* fire-resistance rating of walls enclosing corridors used by the public as access to exit may be waived in an assembly occupancy *however walls are still required to be constructed as fire separations*

❑ indicate number of occupants assigned to each:
- exit stair/ramp/exit door to exterior
- horizontal exit
- exit door from hazardous classrooms/high occupant load areas when occupant load exceeds prescribed number
- door dividing corridor leading to an exit
- *Add up number of occupants for each floor and transfer total to occupant load line in building code data*

Floor Plans

basements/floors below grade

❑ fire fighting access:
- to unsprinklered basements having greater than prescribed horizontal dimension:
  - from at least one street
  - by doors/windows/other means, dimensions *as prescribed* or
  - interior stairway immediately accessible from outdoors

❑ fire separations/firewalls:
- openings protected with closures having prescribed fire protection rating:
  - *refer also to notes under* ***floors above grade*** *below*
- unsprinklered basements compartmentalized at prescribed maximum areas
- firewall at floor above not required to continue into basement storage garage below

❑ fire stops in unsprinklered crawl spaces: compartmentalized at prescribed maximum areas/dimensions

❑ storeys extending more than one storey below ground:
- sprinklered
- floor assemblies constructed as fire separations with fire-resistance rating *as prescribed*
- exceptions for residential occupancies *as prescribed*

❑ underground walkways connecting buildings:
- non-combustible construction
- sprinklered
- separated from buildings by fire separations with fire-resistance rating *as prescribed*
- smoke barrier doors spaced along walkway *as prescribed*
- travel distance to nearest exit *as prescribed*

❑ industrial occupancies:
- basements used as repair/storage garages:
  - access to stairways/elevators through vestibules
  - continuous curb/guard of prescribed heights around every floor opening/ perimeter where exterior walls omitted
- vapour-tight separation required to separate basements/building services rooms from remainder of building where volatile/explosive materials are stored/ manufactured/handled

floors above grade

❑ fire separations/firewalls:
- openings protected with closures having prescribed fire protection rating:
  - limited to maximum opening sizes/temperature rise *as prescribed*, not more than prescribed maximum % of firewall length
  - fixed wired glass assemblies

- glass block reinforced in each horizontal joint
- no glass block/ fixed wired glass assemblies permitted as closures to openings in firewalls
- enclosure having same fire-resistance rating as surrounding construction forexhaust piping from emergency power systems

❑ exit stairways: used for exiting only:
- except as access to a floor area
- service rooms/spaces or certain ancillary rooms not permitted to open into exit stairway

fire separation:
- same fire-resistance rating as surrounding construction
- without any penetrations except *as prescribed*
- additional requirements for separation between scissor/contiguous stairs:
  - smoke tight
  - no interconnecting doors between contiguous stairs

❑ spatial separation/exposure protection of exterior walls:
- limiting distance *as prescribed* defines:
  - measurement of exposed building face
  - required construction/fire-resistance rating of building face
  - permitted area of unprotected openings
- in unsprinklered buildings requiring prescribed spatial separation:
  - unprotected openings in exterior walls which are parallel or at less than 135° and in different fire compartments
- additional protection required for:
  - exit door/stair/ramp exposed to an opening in an adjacent wall at less than 135° and closer than prescribed distances, horizontally and vertically
  - exit door in one fire compartment exposed to an opening closer than prescribed horizontal distance in exterior wall of another fire compartment when wall is at less than 135°
  - openings protected with closures:
    - fixed wired glass assemblies
    - glass block reinforced in each horizontal joint

❑ covered walkways/vehicular passageways between buildings:
- separated from buildings by fire separations with prescribed ratings
- noncombustible construction when connected to a building of noncombustible construction, *except*:
  - heavy timber construction permitted for ground level walkway when not less than prescribed % of perimeter is open to the outdoors

❑ mezzanines/openings through floor assemblies:
- mezzanines permitted to be open/ unprotected in prescribed occupancies:
  - when conforming to dimensions/ visibility *as prescribed*
- interconnected spaces:
  - conforming to:
    - configuration/fire separations/ sprinklering *as prescribed*
    - additional provisions for exiting/fire separations for portions of interconnected space having floor level more than prescribed distance above grade
  - access to exit not permitted through interconnected space from floor area outside the space
  - requirements waived/modified:
    - when space sprinklered
    - for certain prescribed occupancies
    - when building height not more than prescribed number of storeys

❑ passage of smoke into exit stairshafts/ elevator shafts opening into interconnected space limited:
- when building over prescribed height, by building design
- when interconnected space over prescribed height, by vestibules having:
  - prescribed fire separation/distance between entrance/exit doors
  - mechanical air supply or
  - vent opening to outdoors

❑ passage of smoke from interconnected space through access openings into sleeping rooms in care/treatment occupancies restricted by vestibules having mechanical air supply

❑ unprotected openings permitted for:
- stairs/escalators/inclined moving walks in prescribed occupancies when entire building sprinklered

- vehicular ramps in storage garages
- openings required for a manufacturing process

❑ protection at edges of open floors in industrial buildings:
- toe-board to prevent tools/other objects falling

Means of egress:

❑ *applies also to basements/floors below grade*

❑ minimum two exits required from each occupied floor area *except:*
- floor areas in buildings not more than two storeys in height may be served by one exit provided floor area/travel distance not more than as prescribed

❑ capacity based on occupant load of area served:
- determine required widths of corridors/doorways/ramps/stairs by multiplying occupant load by prescribed factors based on occupancy classification
- no obstruction restricting width to less than prescribed unless unobstructed alternative available nearby/clearly visible

❑ no mirrors permitted in/adjacent to exits that would confuse direction of exit

❑ each suite provided with doorway:
- opening to exterior/public corridor having two opposite directions of exit
  - exceptions for residential occupancies *as prescribed*
- width based on occupant load

❑ at least two egress doorways required from:
- hazardous suites/rooms/classrooms exceeding prescribed area
- suites/rooms/mezzanines:
  - having greater than prescribed occupant load
  - exceeding prescribed area/ travel distance
  - requirements modified for sprinklered spaces
- occupied roof having greater than prescribed occupant load
- rooftop enclosure/service space exceeding prescribed area/ travel distance
- least distance between doorways *as prescribed*
- when more than one exit from a floor area is required, every exit shall contribute not more than half required exit width

❑ means of egress required from every:
- podium/terrace/platform/contained open space/occupied roof/ rooftop enclosure

❑ travel distances to nearest exit not more than prescribed distance based on occupancy classification, measured from:
- any point in floor area along path of travel to exit *or*
- any point in fire compartment to door into adjoining fire compartment or
- egress door into corridor/exterior passageway from suite/room, provided suite/room separated from remainder of floor by a fire separation having:
  - prescribed fire-resistance rating or
  - no fire-resistance rating if building sprinklered
- modifications as permitted for sprinklered buildings

❑ corridors:
- prescribed minimum widths based on occupancy classification:
  - hazardous obstructions into corridor width prohibited
- minimum ceiling height *as prescribed*
- occupancies in corridor *as prescribed*:
  - located so as not to reduce prescribed unobstructed width
  - combined area of all occupancies not more than maximum prescribed % of corridor area
- dead end corridors permitted only *as prescribed*

❑ aisles/seating in assembly occupancies *as prescribed*

❑ exits through lobbies
- one exit may lead through lobby provided:
  - distance of lobby floor above grade/travel distance to outdoors not more than prescribed
  - fire separation maintained between lobby and exit
  - lobby not within an interconnected space *as prescribed*
  - exceptions/modifications for sprinklered buildings *as prescribed*

❑ horizontal exits:
- restrictions *as prescribed*
- sufficient floor area on each side to accommodate occupants of both floor areas calculated *as prescribed*

- ramps used for any difference in level between connected floor areas:
  - slope *as prescribed*
  - stairs not permitted

❑ doors:
- swing on vertical axis
- swing: in direction of egress for:
  - rooms having greater than prescribed occupant load
  - hazardous rooms: except doors from boiler/incinerator rooms swing inward when opening into corridor/any room in assembly occupancy
- pair of doors in a corridor providing access to exit in both directions:
  - swing in opposite directions *with* door on right hand side swinging in direction of travel to exit
- minimum clear opening width for single leaf door/active leaf of multiple doors *as prescribed*
- transparent doors/sidelights:
  - safety/wired glass
  - doors designed/constructed to be clearly identifiable
  - sidelights protected with barriers/guards

❑ sliding doors:
- required to swing on a vertical axis in direction of egress when pressure applied:
  - *not applicable for certain occupancy classifications*

❑ revolving doors:
- collapsible in emergency
- hinged doors with equivalent exiting capacity adjacent
- permitted as exit from ground floor level only
- located not less than prescribed distance from foot of any stairway
- maximum permitted capacity
- exceptions for electrically operated revolving doors *as prescribed*

high buildings:

❑ *additional provisions as required by Building Code/Authorities Having Jurisdiction for buildings over prescribed heights/occupant load*

❑ building designed so that smoke from fire will not reach:
- floor areas above lowest exit storey
- any exit stair
- fire fighters' elevator shaft
- connected building

❑ requirements waived/modified when:
- building sprinklered
- stairways vented to outdoors *as prescribed*
- smoke from below lowest exit storey prevented from moving into upper storeys
- capability to shut off circulation fans at central alarm and control facility
- residential buildings have:
  - lower than prescribed building height/occupancy
  - exterior balcony for each suite
  - prescribed areas of refuge

❑ emergency access to floor areas from exit stairs:
- no locking devices on doors giving access to prescribed floor areas except when other access provisions are available *as prescribed*
- at least one other exit must be accessible through unlocked doors within floor area

❑ means of venting each floor area by:
- openable windows/wall panels/smoke shafts *or*
- building exhaust system, if building sprinklered

Roof Plan *as required*

❑ fire fighting access:

❑ to roof with lower than prescribed slope on a building over 3 storeys in height:
- by stairway *or*
- by hatch of prescribed dimensions with fixed ladder
- with prescribed clearances around roof signs or other obstructions

❑ spatial separation/exposure protection of exterior walls in unsprinklered buildings:
- skylights in roof adjoining an exterior wall having unprotected openings closer than prescribed distances, horizontally and vertically
- combustible skylights permitted in non-combustible construction:
  - extent contingent on flame-spread ratings *as prescribed*

Reflected Ceiling Plans

❑ fire separations:
- fire stop flaps in rated membrane ceiling assemblies
- delineate % of total ceiling areas for finishes which may exceed flame-spread rating/smoke developed classification *as prescribed*

- ❑ fire detection systems:
  - fire detectors/smoke and heat detectors installed in all prescribed rooms
  - fire and heat detectors not required in sprinklered floor areas

Building Sections

- ❑ Indicate locations and fire-resistance ratings of all:
  - required fire separations/firewalls
  - floor/roof assemblies *as prescribed*
    - over basements (fire separation not required over crawl spaces *as prescribed*)
    - mezzanines considered as a storey
    - portion of roof supporting an occupancy
    - rated membrane ceiling assemblies
  - loadbearing walls/columns
- ❑ permitted combustible components in non-combustible construction:
  - combustible roofing materials *as prescribed*
  - combustible flooring/interior finish: maximum thickness *as prescribed*
  - combustible elements in partitions
  - protection required of foamed plastic in walls/ceilings/vertical service spaces *even in permitted combustible construction*
- ❑ vertical fire separations continuous elements:
  - from wall to wall
  - from floor up through ceiling space to underside of structure above (when separation falls under steel joists/beams, continuity maintained by rated enclosure of joists/sprayed fireproofing on beams *or other means*)
  - smoke-tight joints around entire perimeter
  - service penetrations fire stopped *except as noted below for horizontal service spaces*
  - openings protected with closures having prescribed fire-protection ratings:
    - fire dampers
  - combustible components abutting/supported by non-combustible fire separation designed so that their collapse under fire conditions will not cause collapse of fire separation
- ❑ horizontal service spaces:
  includes ceiling/duct/crawl/attic or roof spaces
  - no closure required at vertical fire separation, provided construction enclosing ceiling/plenum space has equivalent fire-resistance rating to that of vertical separation *as prescribed except*
  - not permitted when vertical fire separation encloses a vertical shaft
  - materials within horizontal service spaces:
    - conform to flame spread ratings/smoke developed classification *as prescribed*
    - supports for ceiling membrane non- combustible with melting point *as prescribed*
    - access panels required *as prescribed*
- ❑ firewalls continuous from ground to/through roof:
  - may terminate at underside of reinforced concrete roof slab *under certain provisions*
  - parapet height contingent on required fire-resistance rating of firewall *as prescribed*
  - not required in basement storage garage below firewall
  - connected/supported members/pipes/ducts designed so that their collapse will not cause collapse of firewall
  - no combustible projections on exterior of building permitted within prescribed distance either side of end of firewall
- ❑ spatial separation/exposure protection of exterior walls:
  - additional protection required for:
    - foamed plastic insulation in walls over three storeys high *as prescribed*
    - structural members outside exterior face of building closer than prescribed distance from property line
    - soffits of common attic/roof spaces spanning more than two residential occupancy suites or two sleeping rooms, *except when:*
      - spaces separated into compartments by fire stopping
      - eave overhangs separated from remainder of attic/roof space by fire stopping
      - suites/rooms are sprinklered
    - vertically separated openings in prescribed mercantile/industrial occupancies
- ❑ fire stops in concealed spaces:
  - in ceiling/flooring systems:
    - to separate spaces into prescribed maximum areas
  - in roofs/balconies/canopies:
    - to compartmentalize unsprinklered spaces at prescribed maximum areas/dimensions
    - contingent on flame-spread rating of construction materials

Elevations

- ❑ fire fighting access:
  - to every unsprinklered above grade storey within prescribed distance above grade by at least one unobstructed window or access panel of prescribed dimensions:
    - for each section of prescribed wall length
    - on each wall required to face a street
    - window glazed with plain glass *or*
    - access panel readily openable from both inside and outside
  - to unsprinklered basements having greater than prescribed horizontal dimension:
    - *refer to Floor Plans - basements*
- ❑ spatial separation/exposure protection of exterior walls
  - determine permitted maximum area of unprotected openings in an exterior wall for applicable limiting distance:
    - for unsprinklered/sprinklered buildings *as prescribed*
    - *convert area of unprotected openings to % of wall area for inclusion in building code data summary*
  - maximum area of unprotected openings doubled if openings glazed with:
    - fixed wired glass assemblies
    - glass block reinforced in each horizontal joint
  - exceptions for walls of open-air storage garage having greater than prescribed minimum limiting distance

high buildings:

- ❑ means of venting each floor area by openable windows/wall panels

Wall Sections

- ❑ permitted combustible components in non-combustible construction:
  - minor combustible components *as prescribed*
  - combustible material in metal roof deck assembly protected by:
    - gypsum board
    - thermal barrier
    - no protection required if building sprinklered
  - combustible vertical glazing/sash/frames:
    - *usually limited to first/first & second storeys*
    - extent contingent on flame-spread ratings
    - exceptions if sprinklers installed *as prescribed*
  - combustible components in exterior walls *as prescribed*
  - combustible insulation protection:
    - locations/protection contingent on flame- spread ratings
  - combustible elements in canopies/mezzanines:
    - protection of wall openings above marquees for unsprinklered buildings *as prescribed*
- ❑ fire stops in concealed spaces:
  - between concealed spaces in interior wall/ceiling/crawl spaces and concealed spaces in exterior walls and attic/roof spaces
  - in wall assemblies:
    - at every floor/ceiling level
    - at prescribed maximum horizontal/ vertical dimensions
    - exceptions as permitted

Details

interior elevations:

- ❑ delineate % of total wall areas for finishes which may exceed flame-spread rating/smoke developed classification *as prescribed*
  - flame-spread ratings modified in corridors *as prescribed*
- ❑ modifications/exceptions for sprinklered buildings *as prescribed*

fire stops in concealed spaces

- ❑ between concealed vertical and horizontal spaces in ceiling coves/dropped ceilings/ soffits or between stair stringers:
  - where flame-spread rating of exposed construction materials greater than permitted

stairs/ramps

- ❑ widths determined by occupant load *as prescribed*
- ❑ slip-resistant surfaces
- ❑ demarcation by colour/pattern *when publicly accessible:*
  - leading edge of treads/landings
  - beginning and end of ramps
- ❑ warning signs marking:
  - part of exit stair/ramp continuing past exterior exit door to basement
  - that exit stair in high building does not lead to exit at roof
- ❑ floor numbering on each side of doors to exit shafts
- ❑ stairs:
  - leading edge of treads:
    - radiused/beveled
    - at right angles to direction of exit travel *when publicly accessible*
  - tread/riser dimensions *as prescribed*

- run/rise in any one flight uniform
- no significant alteration in run/rise in successive flights in any stair system
- curved stairs permitted *as prescribed*
- maximum vertical rise of flights between floors/landings *as prescribed*
- minimum three risers except *as prescribed*
- minimum headroom clearance measured vertically from landing/stair nosing *as prescribed*
- landing dimensions/clearances *as prescribed*
- clearances between doors/risers *as prescribed*
- *exterior fire escape stairs permitted only for existing buildings as prescribed*

❑ ramps:
- slopes *as prescribed*
- landings/level areas adjacent to doors *as prescribed*

❑ handrails:
- number required determined by width of stairway/ramp
- height *as prescribed*
- continuously graspable *as prescribed*
- minimum clearance between handrail/wall *as prescribed*
- continuous on both sides of stairway, including landings *as prescribed for certain occupancy classifications*
- termination:
  - not to obstruct pedestrian travel/create a hazard
  - at least one handrail extended horizontally beyond top and bottom of stairway/ramp

❑ guards:
- height *as prescribed*
- openings through guard limited to sizes which would prevent/permit passage of spheres of prescribed diameters based *on occupancy classification*
- designed to prevent climbing
- exceptions *as prescribed*

elevators: fire alarm requirements *based on occupancy classification/occupant load of building:*

❑ elevators equipped with automatic emergency recall:
- manual in sprinklered high buildings:
  - key box/key switches in recall level lobby/central alarm and control facility
- identify recall level lobby to which elevator(s) return automatically upon fire alarm actuation in unsprinklered buildings

high buildings:

❑ at least one elevator equipped for emergency operation/use by fire fighters:
- with prescribed minimum size/load capacity
- protected by vestibule

Schedules

❑ doors & frames:
- minimum headroom clearance *as prescribed*
- maximum reduction of headroom by door closer/other device *as prescribed*
- doors in fire separations labeled:
  - fire protection ratings *as prescribed*
    - 20 minute closure ratings permitted *as prescribed*

❑ door hardware:
- latches *as prescribed*:
  - roller catches permitted in care facilities *as prescribed*
- self-closing devices
  - door stops *as prescribed*

❑ weatherstripping to retard passage of smoke *as prescribed*

❑ exit doors:
- readily operable without keys/special devices:
  - except in secure areas *as prescribed*
- no automatic locking except for doors into hotel rooms
- hardware mounted not higher than prescribed distance above floor
- closers/electromagnetic hold-open devices *as prescribed*
- electromagnetic locking devices permitted *except for certain prescribed occupancies*

❑ wall/partition/roof types:
- note fire-resistance ratings when applicable:
  - ULC references *or equivalents*

Structural

❑ heavy timber in combustible construction having prescribed maximum fire-resistance rating:
- minimum dimensions *as prescribed*
- avoid thin sections/sharp projections
- self-releasing hangers where supported by masonry walls

❑ fire-retardant treated wood:
- schedule/indicate locations
- roof system supported by:
  - fire-retardant treated wood
  - heavy timber
  - non-combustible
  - combination of the above

❑ stair/ramp handrails:

- designed to withstand nonconcurrent loading values *as prescribed*

❑ anchor systems on building exterior:
- for maintenance/window washing

Mechanical

❑ permitted combustible components in non-combustible construction:
- extent contingent on flame-spread rating/smoke developed classification
- exceptions if building sprinklered
- ducts/piping/plumbing fixtures

❑ fire separations/firewalls:
- fire dampers having prescribed fire protection rating in ducts penetrating fire separations
- fire stop flaps in rated membrane ceiling assemblies
- no ducts connecting storage garage/dwelling units permitted
- no penetrations through electrical vault fire separations except:
  - essential pipes/ducts *as prescribed*
  - ventilation duct/opening to outdoors

❑ means of egress:
- no penetrations through exit stairway/ramp walls except:
  - standpipe/sprinkler piping
  - noncombustible piping serving exit only
  - venting near bottom of stair shafts in sprinklered high buildings *as prescribed*
- use as a plenum not permitted
- fuel-fired appliances not permitted:
  - in corridors serving as an access to exit
  - under any exits

❑ carbon monoxide detectors:
- required *as prescribed*

❑ interconnected spaces:
- smoke control following activation of sprinkler system/smoke detectors:
  - automatic activation of air handling equipment
  - other measures *as prescribed*

❑ fire control systems:
- *requirement based on occupancy classification/occupant load of building*
- smoke control:
  - air handling system designed to limit circulation of smoke between:
    - storeys
    - suites within a storey
    - fire compartments
- automatic sprinkler system:
  - required for certain occupancy classifications *as prescribed*
  - designed to required NFPA standard
  - protected from freezing if located in unheated area
  - fire department connection located within prescribed unobstructed distance from hydrant
  - sprinklers required in:
    - rooms/closets immediately below roof assembly for which fire resistance rating waived
    - service spaces *as prescribed*
  - for buildings having fewer than prescribed number of sprinklers, water supply for sprinklers may be connected to domestic water system *as prescribed*
  - combustible sprinkler piping may be permitted in residential/light hazard occupancies, provided piping separated from areas served by ceiling/walls/soffits of prescribed construction
- standpipes/fire hose cabinets required for buildings:
  - over prescribed heights
  - unsprinklered buildings of any height having:
    - prescribed occupancies
    - larger than prescribed areas
  - fire department connection
  - hose connections:
    - on each storey of building
    - size *as prescribed* for building height/area
  - hose cabinets:
    - size to accommodate fire extinguisher in addition to prescribed hose/all accessories
    - locate cabinets where:
      - prescribed
      - fully opened door will not obstruct required exit width
    - cabinets not required in industrial buildings
- portable fire extinguishers:
  - required in all buildings:
  - exceptions within dwelling units *may be granted by Authorities Having Jurisdiction*

❑ buildings where impurities/contaminates have potential to create fire/explosion hazard:

- appropriate exhaust ventilation system
- explosion relief devices/vents/other protective measures

high buildings:

❑ means of venting each floor area by building exhaust system, if building sprinklered

Electrical

❑ combustible construction:
- protection of wires/cables/raceways *as prescribed*

❑ permitted combustible components in non-combustible construction:
- extent contingent on vertical char/flame-spread ratings *as prescribed*
- wires/cables/raceways

❑ means of egress:
- no penetrations through exit stairway/ramp walls except:
  - totally enclosed wires/cables, noncombustible raceways serving exit only

❑ interconnected spaces:
- smoke control following activation of sprinkler system/smoke detectors:
  - emergency power available, supplied by emergency generator/separate power supply

❑ fire alarm and detection systems:
- *requirement based on occupancy classification/occupant load of building*
- central alarm and control facility installed close to building entrance facing street or fire department access route
- fire detectors/smoke and heat detectors installed in all prescribed rooms:
  - fire and heat detectors not required in sprinklered floor areas
  - in unsprinklered buildings, provide smoke detectors designed as part of the building fire alarm system:
    - in each elevator lobby on each storey
    - in recall level lobby to divert elevator on automatic emergency recall to an identified alternate floor level
- manual pull stations at prescribed locations
- alarm signals:
  - audible signal devices:
    - located to be clearly audible throughout floor area served
- visual signal devices:
  - provided in areas:
    - occupied by persons with hearing impairment
    - having high ambient noise levels
    - used for special care/treatment
  - located to be visible throughout floor area served
- smoke alarms installed in:
  - each storey/mezzanine of a dwelling unit
  - each sleeping room not within a dwelling unit

❑ emergency lighting/power:
- exit signs:
  - visible from exit approach
  - over exit doors *as prescribed*
  - additional signs as required to indicate direction of egress
- minimum prescribed illumination level in:
  - exits/corridors
  - various occupancies *as prescribed*
- emergency power for:
  - emergency lighting
  - fire alarm system
  - building services, including:
    - elevators/smoke control/venting in high buildings
    - water supply for fire fighting where supply is dependent on electrical power supplied to building
  - not required for water supply to standpipe system

high buildings:

❑ central alarm/control facility:
- readily accessible to fire fighters at entrance level
- voice communication system

❑ electrical conductors supplying emergency equipment:
- protected by rated separations
- meeting fire endurance tests

Checklist: Information to Include on Drawings for Small Part 9 Buildings

Notes
If an architect is engaged for a project which falls within the definitions for Part 9, the services provided by the architect should uphold the professional standards outlined in these Checklists, whether or not the Building Code requires the building to be designed by an architect.

The Checklist is divided into two levels of detail, either of which may be used as appropriate. The first level covers the minimum documentation necessary to obtain a Building Permit.

The second level of detail, which is underlined, expands the scope to a full set of documents appropriate for a custom design.

Comments, clarifications or recommendations are in *italics*.
Use of a forward slash (/) signifies *and* or *or*

Title Block

refer also to Chapter 2.3.7, page 6

- ❑ *use same drawing (sheet) size and title block layout for **all** drawings in the project set, including drawings prepared by landscape architect, engineers or other consultants: (if some consultants prefer to use their own title block layout, they may do so, provided all the following information is included in their title block and their drawing size is the same as the architectural drawings)*
- ❑ project name/address *same on all drawings, including drawings prepared by consultants*
- ❑ project number
- ❑ date *same date on all drawings, including drawings prepared by consultants*
- ❑ *three columns:*
  - *the first headed* ISSUED FOR *stating reason for issuing drawings, for example:permit application/client approval/bidding/ addenda/contract/construction/change order/etc.*
  - *the second column headed* DATE,
  - *the third for the* INITIALS *of the person responsible for the issuance*
- ❑ drawing (sheet) title
- ❑ drawing (sheet) number + revision suffix *as required*
- ❑ scale of plot or paper copy *use additional graphic scale on any drawings which may be reduced*
- ❑ revision details:
  - revision number
  - date
  - general description
  - initials of originator
- ❑ name/address/e-mail address/telephone & fax numbers of architect's office *[in Ontario, name of the holder of the Certificate of Practice must appear]*
- ❑ architect's logo *optional*
- ❑ names or initials of CAD technician or draftsperson and person checking drawing
- ❑ space for north point *on relevant drawings only (Site Plan, Key Plan, Floor Plans, etc)*
  - *if the angle of the building on the site is such that the orientation of a side is not readily apparent, **add** an arbitrary* 'project north' *point, aligned parallel to the building, beside the correct* 'true north' *point*
- ❑ location diagram with portion of building plan cross-hatched showing which part of floor is on sheet *required only if entire building plan, when drawn at recommended scale, will not fit on one sheet*
- ❑ space for applying architect's professional seal and signature

(NOTE: on small projects, it may be convenient to include components designed by an engineer (e.g. structural elements; heating system; electrical circuitry) on an architectural drawing which is sealed and signed by the architect; in this event, the engineer's professional seal must also be applied to each relevant drawing (preferably placed adjacent to the components designed by the engineer), with a notation identifying which items the engineer is responsible for)

- ❑ title block on separate drawings for engineering disciplines should be similar in content and format except that architect's logo, professional seal, name and other information are omitted and replaced by corresponding logo, professional seal, name and other information for engineer(s) subject to:
  - *contractual arrangement with consultants*
  - *requirements of provincial association*
  - *professional liability insurer*
- ❑ notice of copyright (refer to chapter 2.3.7 Supplement No. 1, September 1999)
- ❑ electronic file name and number/date of plot *placed consistently at very bottom or top of title block*

Cover Sheet *(optional)*

- ❑ project name
- ❑ project location *small-scale partial map of community with location of project marked/ placed on Site Plan sheet if cover sheet not used*
- ❑ architect's name, logo
- ❑ list of drawings *in specifications or first sheet if cover sheet not used*

Site Plan

scale: as large as feasible within selected sheet size

- ❑ *note stating data taken from survey plan/other information provided by client (refer to Chapter 2.3.4, Checklist CH-42):*
  - *give surveyor's name and drawing title/number/date*
  - *note stating source(s) of other information*
  - *same building orientation as floor plans*
- ❑ project location *small-scale partial map of community with location of project marked*
- ❑ site boundaries:
  - dimensions/orientation of property lines
  - angles at intersections
- ❑ rights-of-way/easements
- ❑ zoning setback lines *if required by Authorities Having Jurisdiction*
- ❑ benchmark, noting its:
  - actual (geodetic) elevation
  - assumed (convenience) elevation *used for specific project/usually designated 100m*
- ❑ existing conditions:
  - levels/elevations:
    - contour lines/spot elevations
    - indicate top/bottom at abrupt changes in level
    - crown of street(s)/top & bottom of curbs
  - ditches/swales/water courses/ponds
  - catch basins/fire hydrants/maintenance access covers
  - existing buildings/fences/poles/ buried services:
    - on site
    - adjacent to site
    - differentiation between existing/new for addition/renovation projects
  - paving:
    - sidewalks/paved areas/ driveways/curbs/curb cutouts
  - vegetation:
    - species/caliper of trees greater than 100mm
    - shrubbery
- ❑ borehole locations *as required; borehole logs* ***not*** *shown on drawings, but available in geotechnical report referenced in specifications*
- ❑ outline of building on site:
  - located horizontally from property lines
  - main floor level:
    - geodetic elevation or
    - relative to bench mark
- ❑ grading/earthwork:
  - proposed levels/elevations *some of this information may appear on landscape architectural drawings or civil engineering drawings*
- ❑ landscaping:
  - existing planting/trees to be removed/retained/protected
  - proposed *new landscaping may be developed later by landscape architect*
- ❑ site works:
  - paving:
    - light/medium/heavy duty asphalt *indicate extent of each*
    - parking areas/roads

  - parking lot layout/painted lines
  - fire access route(s)
  - interlocking
  - other
- sidewalks/curbs/ramps
- concrete pads for transformers/air conditioning condenser *as required*
- oil tank *as required*
- surface water drainage:
  - ditches/swales/catch basins
  - flood control/containment/confined areas/other environmental protection *as required*
  - siltation control devices *as required by Authorities Having Jurisdiction*
- septic tank/disposal bed *as required*
- well *as required*
- proposed levels/elevations
- fencing/walls/garbage enclosure/hoarding

❑ site servicing information:
- *some or all of this may be shown on engineering drawings*
- system of foundation drainage
- catch basins/fire hydrants/maintenance access covers
- utilities and other service connections

❑ zoning and building code data *(refer to OAA Practice Bulletin A.9, April 2002)*

❑ site details *as required*

Key Plan *recommended*

recommended scale: 1:200

❑ outline plan of each floor level *to show entire building layout on one drawing sheet:*
- differentiation between existing/new for addition/renovation projects *by cross-hatching/shading*
- no hatching or detail
- all doors with swings *not necessary to show windows*
- ramps/stairs, with up/down arrows
- toilet partitions/plumbing fixtures
- names/numbers of all interior spaces
- finish floor level/elevation *for each floor level*

❑ structural grid lines *as required*

❑ primary dimensions:
- overall
- column centres *as required*

❑ fire separations and ratings *as required*

❑ exits *as required*

❑ exit calculations *as required*

❑ location of building sections, cross referenced to other drawings

❑ zoning and building code data *if not on Site Plan sheet*

❑ any other general information

Floor Plans

recommended scales: 1:100, 1:50

decision on appropriate scale depends on complexity of plan information to be provided. If larger scale is selected, plan blow-ups of complex areas may not be required. Incorporate ***all*** *items noted under Key Plans if Key Plans not used. Ensure same orientation for all floor plans.*

❑ differentiation between existing/new for addition/renovation projects *by cross-hatching/shading*

❑ outline plan of each floor of entire building, including basement *or foundation plan if building has no basement* showing:
- scope of demolition work *as required*
- all exterior walls/interior partitions
- doors with swings/windows/other openings -door sizes/types *or provide door schedule*
- basement walls/piers/columns
- outline of wall/pier/column *footings dotted on basement or foundation plan*
- names of all interior spaces *if Key Plan not used*
- identifying number of each space *as required*

❑ finish floor level/elevation *for each floor level*

❑ ramps/stairs, with up/down arrows

❑ plumbing fixtures/toilet partitions *as required*

❑ detailed plan of each floor level:
depending on scale selected, it may be necessary to divide each floor into segments shown on separate drawing sheets; (in this case, indicate match line between segments of plan on each sheet)

❑ delineate wall components:
- masonry wythes/cavity
- insulated metal wall systems
- EIFS/drywall/cladding to stud walls
- *(not necessary to cross-hatch each element if wall types identified by reference numbers as below)*

❑ identify wall assembly types by reference numbers:
- *W1, W2, etc. for exterior walls; P1, P2, etc. for interior partitions*

- schedule giving thickness/name of each component of each wall assembly type, *including cavities, if any,* and locations of air & vapour barriers:
  e.g. W1
  90mm masonry veneer
  50mm air space
  60mm semi-rigid insulation
  air/vapour barrier
  190mm concrete block

(Note: *do not give specifications for components, unless no separate specification document is provided*)

- ❑ structural grid *as required*
- ❑ dimensions:
  - overall wall thickness *(not necessary to dimension each element if wall types identified by reference numbers as above)*
  - partitions
  - locations of windows/doors/other openings

  showing overall dimensions as required
  - column centres *as required if Key Plan not used*
  - cabinetwork *only if interior elevations not used*
- ❑ fire separations and ratings *as required if Key Plan not used*
  - minimum clearances to combustible framing
- ❑ exits *as required if Key Plan not used*
- ❑ exit calculations *as required if Key Plan not used*
- ❑ location of building cross-sections/details *if Key Plan not used:*
  - cross-references to building section/ detail drawings

(Note: use same symbol/geometrical shape consistently for each type of reference throughout set of drawings)

- ❑ outlines of cabinetwork:
  - kitchen/bathroom
  - closets, including rod & shelf/shelves
- ❑ cross-references to interior wall elevations *as required*
- ❑ other work not indicated elsewhere:
  - concrete bases for mechanical/ electrical equipment
  - manufactured items:
    - panel folding doors
    - washroom accessories
    - prefabricated shelving
- ❑ structural:
  - joists/beams/lintels/rafters/roof trusses *show span directions*
  - cross bracing *as required*
  - columns
  - *may be on separate drawing(s) prepared by structural engineer*
- ❑ heating/ventilating/air conditioning:
  - locations of supply and return air grilles *when critical for furniture layouts*
  - main duct risers
  - exhaust fans
  - heat recovery ventilator *as required*
  - furnace/boiler/package HVAC unit(s)
  - hot water heater
  - A/C condenser
  - meters:
    - gas/water
    - location of remote readers *as required*
- ❑ electrical:
  - receptacles/switches/fixtures
  - smoke/CO detectors
  - main panel/service location
  - electricity meter
- ❑ heating/ventilating/air conditioning/electrical:
  - *usually on separate drawing(s) prepared by mechanical/electrical engineer(s)*

Roof Plan *as required*

recommended scales: 1:200, 1:100, 1:50 *not necessarily at same scale as Floor Plans*

- ❑ *same orientation as floor plans*
- ❑ differentiation between existing/new for addition/renovation projects *by cross-hatching/shading*
- ❑ type of roofing (identify roof assembly types by reference numbers *as appropriate*)
- ❑ slope directions
- ❑ location of building cross-sections/details and cross-references to building section/ detail drawings
- ❑ drains/sumps/scuppers/gutters
- ❑ roof pads/curbs/anchors/ladders/guard rails *as required*
- ❑ parapets/low rise walls/screens
- ❑ access hatches/skylights
- ❑ vents/chimneys
- ❑ roof walkways
- ❑ roof-mounted mechanical equipment

Reflected Ceiling Plans *as required*

recommended scales: 1:200, 1:100 (*not necessarily at same scale as Floor Plans)*

- ❑ *same orientation as floor plans*
- ❑ ceiling types - refer to type designations used in finish schedule
- ❑ layout of ceiling suspension grid(s)
- ❑ bulkheads - details *preferably located on*

same sheet
- ❑ cross-references to detail drawings *as required*
- ❑ light fixtures
- ❑ supply diffusers
- ❑ return air grilles
- ❑ heat/smoke detectors *as required*
- ❑ carbon monoxide detectors *as required*
- ❑ legend *showing symbols used*

Building Sections

recommended scales: 1:100, 1:50

- ❑ show all building components that intersect with section - *may include interior elevations showing cabinetwork (kitchen/bathroom/etc.)*
- ❑ differentiation between existing/new for addition/renovation projects *by cross-hatching/ shading*
- ❑ wall assembly types *only if required to augment/clarify notations on floor plans; refer to Floor Plans*
- ❑ levels/elevations:
  - finish floor *for each floor level*
  - roof bearing at walls *as required*
  - grade at building
  - bottom of footings
- ❑ structural grid lines *as required*
- ❑ vertical dimensions:
  - floor to floor
  - floor to roof *as required*
  - window openings
- ❑ fire separations and ratings *as required*
- ❑ cross-references to detail drawings - *use same symbol/geometrical shape consistently for each type of reference throughout set of drawings*
- ❑ structural:
  - footings
  - joists/beams/lintels/rafters/roof trusses *only if required to augment/clarify notations on Floor Plans*
  - in section
  - in elevation *if beyond*
- ❑ heating/ventilating/air conditioning:
  - main horizontal ducts
  - major equipment

Elevations

recommended scales: 1:100, 1:50

- ❑ all building faces:
  - include below-grade foundation walls/footings *dotted*
  - line of grade at building face *(if building form is complex, identify parts of elevation by letter or number on location diagram in title block)*
- ❑ differentiation between existing/new for addition/renovation projects
- ❑ openings - doors/windows/grilles/vents
- ❑ attachments - light fixtures /receptacles/signage/downspouts/flagpoles/ etc. *as required*
- ❑ structural grid lines *as required*
- ❑ exterior construction materials:
  - graphically/notations
  - masonry control joints
- ❑ locations of interior/hidden levels:
  - floors
  - finish floor level/elevation *for each floor level*
  - flat roofs behind parapets
- ❑ vertical dimensions:
  - to doors/windows/other important items requiring location
  - floor to floor or floor to roof *only if not shown on Building Sections*
- ❑ location of building cross-sections/details *only if required to augment/clarify notations on Floor Plans*
- ❑ cross-references to building section/detail drawings *as required*

Wall Sections

recommended scale: 1:20

One or more vertical wall sections may be sufficient to describe/locate all components of typical wall construction; if basic information required for Building Permit cannot be shown adequately by building and wall sections, use large-scale details to show assemblies
(refer to Details)

- ❑ Show all building components that intersect with section:
  - section continuous from footing to roof
  - incorporate typical window or door condition
  - indicate location/material of air/ vapour barriers
  - backfill line *showing foundation drainage/backfill layers*
  - special drainage *as required*
- ❑ column line *as required* - dimensioned to wall face(s)
- ❑ vertical dimensions

- ❑ cross-hatching/symbols to indicate materials, plus notations *alternative: identify wall assembly types by reference numbers (refer to Floor Plans)*
- ❑ structural:
  - footings/reinforcing
  - anchor bolts
  - joists/beams/lintels/rafters/roof trusses

Detailed Floor Plans

recommended scales: 1:50, 1:20
plan blow-ups of complex areas, as required

- ❑ bathrooms/washrooms
- ❑ kitchens
- ❑ special floor finish layouts/patterns/details
- ❑ cross-references to detail drawings *as required*

Details

large-scale details of all building envelope/ assembly conditions:
recommended scales: 1:10, 1:5

- ❑ vertical section details, arranged according to relative positions in wall *typically*:
  - wall/floor intersections
  - window sills
  - window/door heads
  - wall/roof intersections
  - wall assembly type reference numbers
- ❑ horizontal section details *typically*:
  - corners
  - intersections with columns/partitions
  - window/door jambs
- ❑ notations:
  - floor/roof levels/elevations *on vertical section details*
  - typical assemblies not covered by reference numbers
  - through-wall flashings
  - air/vapour barriers
  - dimensions not already shown on plans/elevations/building sections

other details:

small-scale key drawings of assemblies (stairs/ cabinets/etc.) cross-referenced to large-scale details on same or adjacent sheets
recommended scales: 1:50, 1:20, 1:10, 1:5, 1:1
as required

- ❑ door/window elevations:
  - hollow metal door/sidelight/window frames
  - aluminum entrance/sidelight/store front frames
  - window types
  - door types
- ❑ interior wall elevations:
  - elevations of cabinetwork *typically showing horizontal dimensions*
  - other wall-mounted items
- ❑ stairs/handrails/guards
- ❑ fireplace(s)
- ❑ outdoor decks/stairs/rails/trellises
- ❑ cabinetwork/millwork - fully dimensioned, large-scale sectional details
- ❑ large scale sectional details *as required:*
  - wood/aluminum window frame components
  - hollow metal frames

Schedules *as required*

- ❑ wall types *refer to Floor Plans*
  - exterior walls
  - interior partitions
- ❑ roof types *refer to Roof Plan*
- ❑ doors and door frames
- ❑ windows
- ❑ lintels
- ❑ hardware
- ❑ room finishes
- ❑ colour
- ❑ planting

Chart: National Building Code Data Matrix

Introduction

The purpose of the matrix is to provide a standardized system for including building code - related data on a set of drawings that are submitted for building permit application. Numbers in the matrix are the relevant National Building Code (NBC) references. The matrix may be modified to suit the references in various provincial building codes. The Ontario Association of Architects (OAA) has a similar matrix available to be used with the Ontario Building Code.

It is important to put this matrix in a prominent location on the drawings which will:

- expedite the building official's review of the application;
- inform others (contractors, trades, consultants, etc.) about applicable NBC related issues.

Additional information such as exiting widths and routes, fire separations and other data is generally shown on separate drawings, as necessary.

Procedure

1. Establish a system in your practice that facilitates retrieval of the information to be shown on the application for building permit;
2. Ascertain this information through a code analysis in the early design stages of a project and reconfirm it throughout the design development and construction documents (drawing) stages;
3. Consider using the NBC Data Matrix as a standard format which can be adapted as required to meet the specific requirements of each project. It may be preferable to provide more than one matrix for complex projects (for example: underground parking garage - Part 3, townhouses - Part 9, on same site);
4. Assign a location for NBC Data Matrix on the drawings as an office standard (one of the first or top drawing sheets is best);
5. Add exit capacity calculations confirming that exit capacity exceeds occupant load on the same drawing sheet as the NBC Data Matrix, or separately, as appropriate. Always verify reference numbers against the latest NBC revisions;
6. Coordinate with structural, mechanical and electrical engineering consultants and share data with them based on your code analysis;
7. Instruct them to include NBC related data pertinent to their disciplines on their drawings. The building code data should be:
   - prepared specifically for the project;
   - in a similar format;
   - in accordance with the standards of their profession.

If the NBC Data Matrix is included in a project manual (rather than on the drawings), ensure that building name and address, project number and date of issuance are inserted at the top of the matrix.

Completing the Matrix

Matrix presents elements selected from the detailed code analysis and provides a quick overview to the municipal building officials of the key NBC factors governing the design of the project.

Item No.	
1	Check whether the work is regulated by Part 3 or Part 9; identify project; check whether project is new, an alteration and/or addition, or if there is a change of use.
2	Identify major occupancy(s).
3	Enter building area and extent of new and existing; if a portion of the building is to be demolished, enter in the "existing" space only that portion which is to remain, such that the total of new and existing is the area of the final product.
4	NBC does not refer to "gross building area", however, this concept and terminology may be relevant in some jurisdictions.
5,6	Enter number of storeys above and below grade, and height of building.
7	Enter number of streets and access routes.
8	Enter NBC building classification.
9	Obtain information on proposed sprinkler system from engineer; check appropriate box.
10, 11	Obtain information from engineer; check appropriate "yes" or "no" box for requirement for standpipe and fire alarm.
12	Obtain information from engineer responsible; check appropriate box relative to adequacy of water supply for fire protection.
13	Check appropriate box.
14	Enter permitted and actual combustible/non-combustible construction information.
15	Note whether there are mezzanines: how many, where, the area of each or, if none, enter N/A.
16	Provide design information as to occupancy and occupant load per floor, and whether this is derived on the basis of building design, or on the Code requirement for floor area per person.
17	Check appropriate box; if "no" is checked, provide explanation why.
18	Check appropriate box.
19	Enter in spaces provided, required fire resistance rating for floors, roofs and mezzanines, and for supporting members for these; also enter listed design numbers (e.g. ULC) or description for horizontal assemblies and their supporting members. If space in the matrix is inadequate, prepare a separate table, cross referenced for different major occupancies in building as appropriate.
20	Establish "Project North" orientation if different from "Compass North", and show both on Site Plan. Enter spatial separation information in appropriate columns for each elevation, where applicable, identifying Exposing Building Face (EBF), Limiting Distance (LD), Length (L), and Height (H) of building. Use a separate table for spatial calculations if project is more complex than can be accommodated in this table, cross referencing appropriately.
21	Enter any other information that will assist in expediting the issuance of building permit.

References

National Building Code of Canada 1995, revised up to April 2002
OAA Practice Bulletin A.9

Item	National Building Code Data Matrix Parts 3 & 9	NBC Reference	
1	Project Description: ❑ Change of Use ❑ New ❑ Addition ❑ Alteration	❑ Part 3	❑ Part 9 2.1.3.1 9.10.1.3
2	Major Occupancy(s)	3.1.2.1.(1)	9.10.2
3	Building Area (m^2) Existing _____ New _____ Total _____	1.1.3.2	1.1.3.2
4	Gross Area Existing _____ New _____ Total _____		
5	Number of Storeys Above grade _____ Below grade _____	3.2.1.1 & 1.1.3.2	2.1.3.1
6	Height of Building (m)		2.1.3.1
7	Number of Streets/Access Routes	3.2.2.10 & 3.2.5.5	
8	Building Classification	3.2.2.20-.83	9.10.4
9	Sprinkler System Proposed ❑ entire building ❑ basement only ❑ in lieu of roof rating ❑ not required	3.2.2.20-.83 3.2.1.5 3.2.2.17	9.10.8.2
10	Standpipe required ❑ Yes ❑ No	3.2.5.8	
11	Fire Alarm required ❑ Yes ❑ No	3.2.4	9.10.17.2
12	Water Service/Supply is Adequate ❑ Yes ❑ No	3.2.5.7	
13	High Building ❑ Yes ❑ No	3.2.6	
14	Permitted Construction ❑ Combustible ❑ Non-combustible ❑ Both Actual Construction ❑ Combustible ❑ Non-combustible ❑ Both	3.2.2.20-.83	9.10.6
15	Mezzanine(s) Area (m^2)	3.2.1.1.(3)-(8)	9.10.4.1
16	Occupant load based on ❑ m^2/person ❑ design of building Basement: Occupancy _____ Load ____ persons 1st Floor Occupancy _____ Load ____ persons 2nd Floor Occupancy _____ Load ____ persons 3rd Floor Occupancy _____ Load ____ persons	3.1.1.6	9.9.1.3
17	Barrier-free Design ❑ Yes ❑ No(Explain)	3.8	9.5.2
18	Hazardous Substances ❑ Yes ❑ No	3.3.1.2.(1) & 3.3.1.19(1)	9.10.1.3.(4)
19	Required Fire Resistance Rating (FRR) Horizontal Assemblies FRR (Hours) Floors _____ Hours Roof _____ Hours Mezzanine _____ Hours FRR of Supporting Members Floors _____ Hours Roof _____ Hours Mezzanine _____ Hours Listed Design No. or Description (SG-2) Listed Design No. Or Description (SG-2)	3.2.2.20-.83 & 3.2.1.4	9.10.8 9.10.9
20	Spatial Separation – Construction of Exterior Walls	3.2.3	9.10.14

Wall	Area of EBF (m^2)	L.D. (m)	L/H or H/L	Permitted Max. % of Openings	Proposed % of Openings	FRR (Hours)	Listed Design or Description	Comb. Const	Comb. Constr. Nonc. Cladding	Non-comb. Constr.
North South East West										
For Additional Walls, add additional rows										

21	Other



2.3.8 Construction Documents — Specifications

Canadian Handbook of Practice for Architects

2.3.8

Introduction

Specifications and Drawings

Types of Specifications
- Outline or Preliminary Specifications
- Master Specifications
- Model Specifications
- Project Specifications

Methods of Specifying
- Proprietary Method
- Prescriptive Method
- Performance Method

Reference Standards

MasterFormat™
- SectionFormat

Master Specification Systems
- Office Master Specification Systems
- National Master Specification (NMS)
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Preparing Specifications
- Resources
- Coordination
- Assembling Specifications Sections
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- Addenda

Definitions

References

Checklist: Assembling and Writing the Specifications

Construction Documents — Specifications

Introduction

In the construction industry, the term "specifications" means a clearly written description of the intended work of a project. Specifications are precise descriptions of products, materials, standards, equipment, services, construction systems, construction methods and processes, and workmanship.

The specifications also describe physical and environmental conditions to be created and maintained in the work area, on site, in adjacent areas, or off site. In addition, the document sets out procedures for contract administration required to control and monitor the quality of the work.

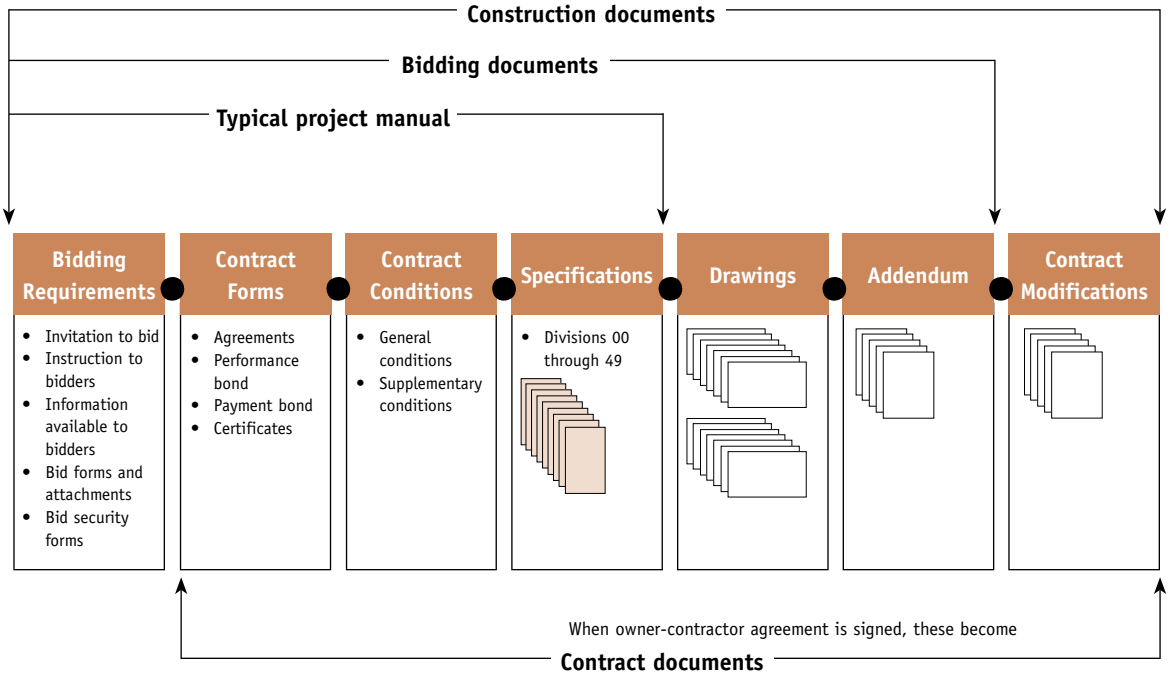
The term "**Project Manual**"— used by The Construction Specifications Institute and by Construction Specifications Canada — refers to the following items, which are bound in book format:

- bidding requirements;
- contract forms;
- contract conditions;
- specifications.

This chapter discusses specifications and — to a certain extent — their relationship to the drawings.

Refer to Chapter 2.3.9, *Construction Procurement*, for information on bidding requirements, contract forms, and contract conditions.

Illustration 1: Format for Construction Documents



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Specifications and Drawings

Specifications must be read and interpreted together with all of the construction documents in combination. The drawings, schedules (which are tables listing components and their locations and properties), and any other graphic representation, supplement the written word.

Refer to Chapter 2.3.7, *Construction Documents — Drawings*, for a description of the drawings.

Most construction contracts, including CCDC indicate that:

- specifications are part of the contract documents;
- the drawings, together with the specifications, translate the design concept into a detailed description of a building;
- in the event of conflict between the two, the specifications take precedence over the drawings.

The specifications become part of the contract documents and should convey information that is clear, concise, correct, comprehensive, and well-coordinated.

Drawings and specifications present different types of information and are complementary.

Drawings:

- illustrate extent, location, and quantity;
- are graphic or pictorial descriptions.

Drawings identify a material or product only by a generic name, and illustrate its approximate shape, dimensions, and location.

Drawings and schedules provide the specification writer with the following information:

- configuration, location, and dimension of each assembly, component or accessory;
- identification of pre-fabricated or pre-assembled components or equipment.

Specifications:

- reduce the need for notes on the drawings;
- are the only location where brand names of products should appear (generally, brand names should **not** be on the drawings);
- describe workmanship and installation.

The function of the specifications is to:

- complement and permit simplification of the drawings;
- limit the role of the drawings to address form, shape, dimension, and location;
- describe requirements for quality and workmanship which the drawings may not be able to address;
- address compatibility of materials.

Types of Specifications

There are a number of types of specifications, including:

- outline or preliminary specifications;
- master specifications;
- model specifications;
- project specifications.

Outline or Preliminary Specifications

This document is prepared during the design stage and describes the project components in general terms — appearance, texture, and other criteria — which affect the image and function of the project. Outline specifications are usually prepared at the design development stage to provide early coordination of terminology between drawings and specifications, and used together with design drawings in making presentations to the client.

Refer also to Chapter 2.3.6, *Design Development*.

Master Specifications

This is a comprehensive text base, containing descriptions of every procedure, product or method likely to be encountered. This collection of specifications can be used in developing a project specification by editing the contents to suit the requirements of the project. The editing is made easy because most of the required text is included in the master document and, to a large extent, one only has to *delete* the unwanted text.

In the case of the National Master Specification (NMS), the text contains and highlights the choices by presenting all of the commonly used alternatives, in square brackets. In other cases, blank spaces — in square brackets — indicate

when a decision must be made. The NMS also uses "Spec Notes" to offer guidance and direction.

It must be emphasized that any master specification must be used very carefully. Such a comprehensive document can be very useful as a checklist for making decisions when assembling a project. However, the process — no matter how easy or convenient — does not reduce the knowledge and experience required to produce an effective project specification.

Model Specifications

This is a specification assembled to suit specific and similar kinds of projects, such as certain buildings within "Part 9" of the building code and some repetitive kinds of projects. Because the technology used to build such projects is common to the building type, such model specifications usually require minimal editing, except for describing site work which is unique to the location.

Project Specifications

Project specifications are usually one-of-a-kind specifications developed for a specific project. Based on the form of construction project delivery, there are usually two different types:

- *Project Specifications for a Stipulated Sum Contract*
  This specification is compiled and written to describe an entire project and is addressed to one general or coordinating contractor.
- *Project Specifications for a Construction Management, Phased, or Design-Build Project*
  This specification is prepared as a number of related but stand-alone modules, each of which has its own "front end" and can form the basis of an individual bid call and contract. The work of each contract is then coordinated into a combined process by a construction manager or Design-Builder to deliver the overall project.

Depending on the form of project delivery, some small projects may include the specifications on the drawings; however, it is important that minimum standards of practice are maintained and all health and life safety requirements are included.

Methods of Specifying

Contemporary construction specifications can be prepared using the following descriptive methods:

- **proprietary** (describes specific products and systems by trade name);
- **prescriptive** (describes the exact means and methods for achieving the desired result);
- **performance** (outlines criteria of a desired result, giving the contractor freedom in choice of materials and method).

These may be used individually or in combination, in outline or in detailed format.

After evaluating the products, systems, and processes for each segment of construction, the architect must decide which specifications method to use. These decisions depend in part on the architect's ability to evaluate specifications, details, and data published or provided by product manufacturers.

Proprietary Method

Proprietary specifications identify products by their trade names and important characteristics, often using catalogue descriptors. Restricting specifications to a single trade name results in the exclusion of others. Naming several acceptable alternatives — such as three or four manufacturers' products — promotes competition, as long as all products or systems listed meet similar criteria.

Example: *Doors (type 5): Flush, Stainless Steel — LS-18 1 by Steelcraft, prepared for glazed opening and louvre as per Door Schedule.*

Note: three or four acceptable alternative products which meet minimum criteria should be listed.

Occasionally, the architect may determine that only one product is appropriate for the project and only that sole product is specified.

Example: *Ceramic Wall Tile (type 6) as scheduled:*
308 mm x 308 mm
beige-brown speckled 'Exemplary Harmony'
By Steenbok Capricorn
No substitutes considered.

The architect may decide to specify one particular product, assembly, equipment or system, as a basis of the specification and invites the contractor to propose an alternative product or system for review. This method may be used, for example, by an engineering consultant, for a complex mechanical or electrical system. This maintains the competitive approach to the bidding process.

Example: The design and specification of the mechanical piping system is based on the use of products by Victaulic. Other acceptable alternative systems will be considered in accordance with procedures established in the Instructions to Bidders.

Public sector clients will usually not permit the proprietary method of specification.

Prescriptive Method

A prescriptive specification is a detailed statement of products, materials or systems and their installation requirements. It is a generic description of what is required, using no product, trade or manufacturers' names, or any reference to manuals or standards. Products and materials are defined, together with a step-by-step list of operations to produce the desired result. Extensive knowledge and experience do not guarantee that the results of a given combination of materials and specific operations will be satisfactory.

The architect must obtain sufficient information and practical experience to describe all the materials and operations necessary for fully prescriptive specifications. The architect's potential liability may be increased because, it might be argued, the architect, rather than the contractor, assumes responsibility for performance, provided the contractor follows the specifications.

Prescriptive specifications do not recognize that there is often more than one way of carrying out a given operation to achieve the intended result. It may be useful to include the following when preparing prescriptive specifications: "complete all work in accordance with the manufacturer's written instructions and specifications."

The architect should separate those construction components which can be adequately and competently described by prescriptive specifications from those which are best described by performance specifications.

Example: a 26-gauge, pre-finished sheet metal flashing

Performance Method

Performance specifications describe the desired end result of how the materials and systems will perform in the completed building. Extensive reference to material standards establishes the project's performance criteria, such as appearance, strength, and durability. When a detailed description of the product is accompanied by a performance statement, then the contractor is clearly responsible for the end product. To achieve the best results, the architect should remember that performance is the prime factor. Full performance specifications require additional research by the architect.

Example: .1 Windows: to CAN/CSA - A440 [M90]
.1 Type: Projected: top projected with triple glazing
.2 Classification Rating
.1 Air Tightness: A3
.2 Water Tightness: B5
.3 Wind load resistance: C2
.4 Condensation Resistance: Temp Index [ ]

Here, the specifier chooses to describe what is needed to comply with the requirements of the project, rather than describing how it is to be built to ensure its required performance. When a component is required to comply with testing procedures that is, in effect, a performance specification.

Often, performance specifications are used to describe systems such as elevators and mechanical systems where performance and capacities must be determined and maintained.

Example: Electric Elevator:
1.3 Description of System:
Platform: 1500 mm x 2000 mm
Rated Load: 2000 kg
Rated Speed: 10 metres/sec
Travel: from basement to 5th floor — 20000 mm

Reference Standards

Specifications frequently incorporate references to standards published by standards organizations and trade associations. Well-written standards allow some latitude in the means of achieving the desired end result, while establishing industry-accepted standards of practice and performance. Provided they are fully familiar with the latest edition of the standards, architects may choose to incorporate some of them, by reference, into the specifications.

References include standards — such as CSA, CGSB, and ASTM, or appropriate trade manuals — to define common criteria. Such trade manuals are produced by a number of national trade associations, for example:

- the Architectural Woodwork Manufacturers Association of Canada (AWMAC);
- the Canadian Roofing Contractors' Association (CRCA);
- the Terrazzo, Tile and Marble Association of Canada (TTMAC).

The use of such standards and manuals will reduce the volume of the specifications to a considerable degree.

Where a standard is referenced, the specifier or architect normally verifies that the number is correct, together with the date of the latest issue of the standard or code. If the standard has been amended, the specifier or architect may confirm that the amendments have not changed any significant criteria that would affect the types and uses of the particular product or procedure.

Refer to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*.

MasterFormat™

The primary purpose of the MasterFormat™ system is to provide a method to:

- organize information contained in project specifications;
- retrieve all files, costs, product literature, references, and parts of project specifications from a single unified system.

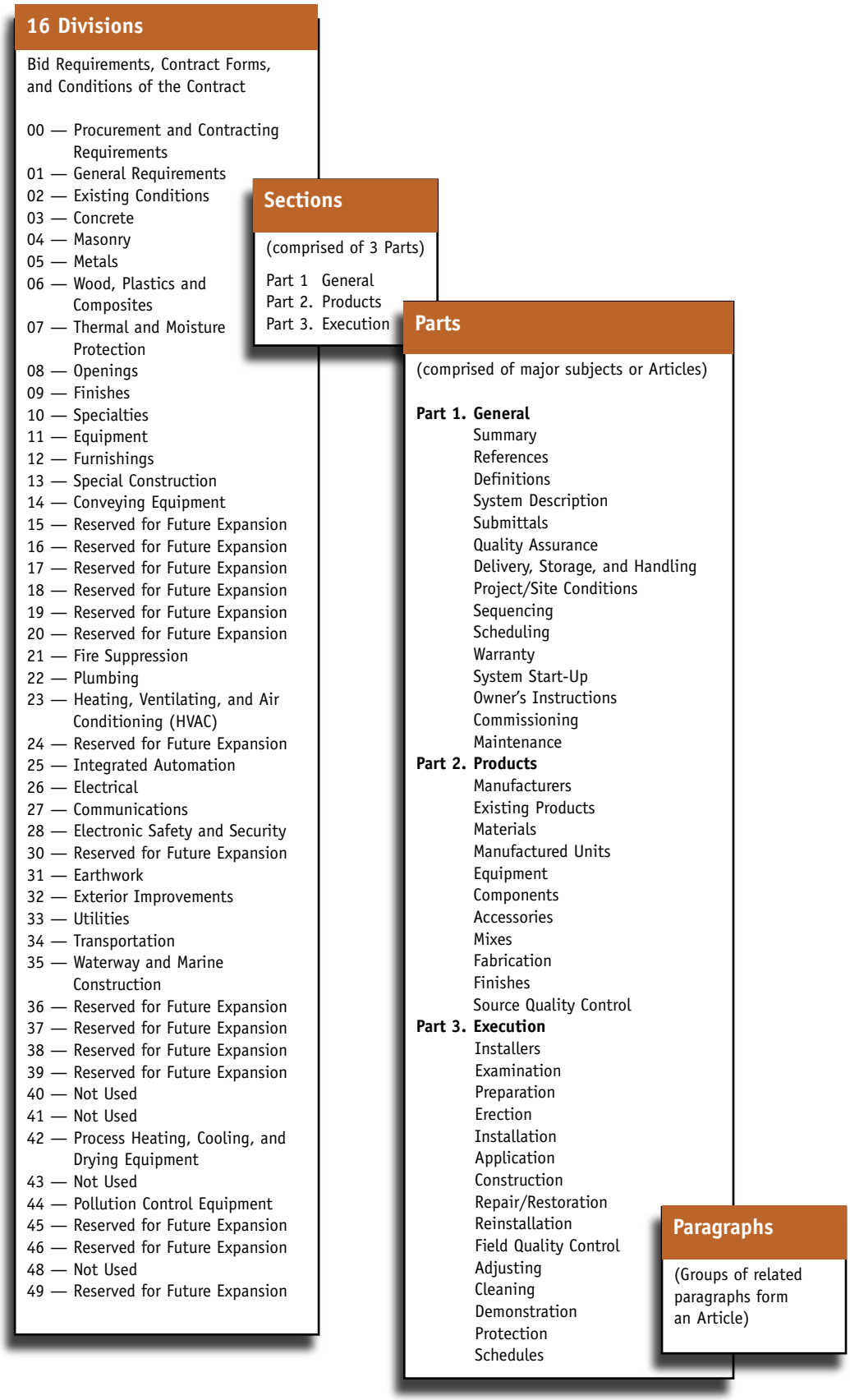
Of the manuals for this purpose, *MasterFormat ™ 2004 Edition, Numbers and Titles* is one of the most widely used. Since 1978, MasterFormat™ has been produced jointly by The Construction Specifications Institute (U.S.A.) and Construction Specifications Canada. Initially conceived in 1963, it has been almost unanimously accepted by the construction industry in the U.S. and Canada.

MasterFormat™ is a system of numbers and titles for organizing construction information into a regular standard order or sequence (refer to Illustration 2). It is organized in the well-known "49 Division" Specification Format, using a six-digit section numbering system. Each section is, in turn, organized according to a three-part format for articles titled: General, Products and Execution. In addition to the 49 divisions and their groups of sections, MasterFormat™ contains what has come to be known as the Series 00 of Documents. It incorporates an organizational structure for documentary information for the Project Manual. Under Division 00 "Procurement and Contracting Requirements" the following is included:

- bidding information and requirements;
- contract forms and bond requirements;
- General and Supplementary Conditions of the contract.

The designation system for the headings for these groupings has been included to standardize the titles, and to allow the storage, search, edit, and retrieval of the various elements. Titles and terminology should be fixed and used in the sequence shown. Any number of additional entries may be inserted by decimal expansion, if required.

Illustration 2: Diagram Illustrating the Framework of the MasterFormat™ System



Note that some titles will be unnecessary under certain methods of construction procurement. For example, bidding information will not be required when the owner is the builder.

The MasterFormat™ system:

- provides a flexible system within a standard framework for fixed sections;
- is adaptable to computer word-processing software;
- allows the user to decide whether to use fixed or flexible section titles.

The guide allows each subject or component to be easily located with the designated, six-digit number.

Using standard titles and numbers results in a higher degree of uniformity within construction specifications. The section titles, given in the index, should be used for either a fixed or a flexible system, using the wording and sequence proposed.

The 49 divisions are titles only, contain no text, and are listed in the table of contents of the specification as a means to search for information contained in sections which are grouped and listed under the heading of that division.

Example: Division 04. Masonry: Section 04 21 13 — Brick Masonry

Every practising architect should use *MasterFormat*™ for producing project specifications and as a basis for an office technical library, for organizing:

- office files of product literature;
- cost data;
- reference material;
- samples.

SectionFormat™

The *Three-Part SectionFormat™ for Construction Specifications* is also produced jointly by The Construction Specifications Institute (U.S.A.) and Construction Specifications Canada. Its primary purpose is to provide a uniform approach for organizing articles and paragraphs within the project specification sections to produce a consistent appearance and completeness, and to facilitate understanding and communication.

Sections, grouped together according to a collection of related work under one of the 49 identified divisions, can be combined and written to suit the project for which they are produced.

Each Section is divided into three **parts**:

- **Part 1, General:**
  This part covers those subjects which:
  - relate to the work in general;
  - provide a general description of the system, where applicable;
  - identify references to standards;
  - define the administrative and technical requirements specific to a particular section.

- **Part 2, Products:**
  This part defines the acceptable equipment, materials, fixtures, mixes, and fabrications, that is, "product" items to be incorporated into the work.

- **Part 3, Execution:**
  This part describes the manner in which items covered by Part 2 are to be incorporated into the work.

The architect should use the *Three Part SectionFormat*™ as a guide in writing specifications sections for *every* project, except for:

- simple outline specifications;
- short specifications for minor projects.

Maintain the established order and sequence of articles even if the three-part format is not used.

Master Specification Systems

Office Master Specification Systems

Many architectural practices use a "master specification" — developed from experience on previous projects — which covers the entire potential scope of building construction, including a large range of options. Computers and word-processing software are widely used for producing specifications and project manuals. Working with the master, the architect or the specifications editor:

- fills in blanks;
- deletes options that do not apply;
- incorporates special requirements not included in the master specification.

Some offices have a specification writer on staff, or engaged on a consulting basis, who takes the contents of the specification, in its raw state as provided by the architect, and edits it into the standard formats and expressions. These specification writers often enter the process during the production of the working documents.

National Master Specification (NMS)

Nationally supported master specifications are widespread in the construction industry. Regardless of the source, the architect assumes responsibility for the specifications issued from the architectural practice.

The NMS is a library of construction specification sections, written in contract specification format. Produced by the federal government in consultation with the private sector, it is the most widely used master specification in Canada. The NMS Secretariat, which is part of Public Works and Government Services Canada (PWGSC), is responsible for the NMS. All data are stored electronically and organized into sections following *MasterFormat*™.

The NMS could be termed a "deletion" master. It allows for the fast deletion of inapplicable portions of the specifications and the reduction of errors and editing time.

The NMS is flexible and suitable for:

- large, medium or small projects;
- new or renovation construction;
- private or public (government) work;
- varying bid or contract arrangements.

It does not restrict the designer from:

- specifying any products;
- using any design concepts;
- employing any construction techniques.

Furthermore, the NMS uses text that is clear, precise, and detailed enough to convey the desired meaning. The NMS also:

- incorporates the accumulated expertise of Canada's foremost authorities on specifications, documents, and construction technology;
- is reviewed by industry to ensure it represents current trade practices and construction technology;
- is regularly updated to incorporate the latest use of recommendations, products, and construction changes, as well as standard and code revisions;
- is undergoing "green" revisions to ensure the incorporation of environmentally sustainable construction practices.

U.S. Master Specification Systems

Masterspec® is the master specification system of The American Institute of Architects (AIA). One of the products of AIA Master Systems used to prepare drawings and specifications, Masterspec® was started in 1972 by Arcom, a division of an architectural firm in Salt Lake City.

Masterspec® provides a wide range of specification products, software and services. *www.arcomnet.com/masterspec/index.php*

Proprietary Systems and Specification Writers

Many independent specification writing firms specialize in the preparation of technical specifications and bidding documents for construction projects, and the preparation of guide specifications for building product manufacturers.

Before selecting one of these firms to provide either a master specification, or a specification developed and written for a single project, the architect should:

- review examples of the work of several firms;
- evaluate the appropriateness of their work for the architect's needs;
- consult references.

Because ownership of the copyright can become an issue, the architect must:

- clarify the client's expectations about ownership of the copyright;
- determine whether the specification consultant expects to retain the copyright of the specification that has been developed and then negotiate an appropriate agreement.

Typically, the copyright of the documents at any stage of their development will be the property of the architect. If an architect chooses to engage an independent specification writer, the architect — as the prime consultant — will be responsible for the specifications but the copyright will rest with the specification writer unless it is assigned to the architect. The architect retains the right to modify the text as provided. In addition to the final hard (paper) copy, an electronic copy should be submitted.

The specification writer or "specifier" should always be well-informed on the progress of the project and current with the production of all documents, including drawings and schedules. This ensures consistency and proper coordination between the specifications and the drawings.

Some specification writers are members of Construction Specifications Canada (CSC). Refer to Chapter 1.2.3, *Consultants*, for a brief description of CSC.

Preparing Specifications

Resources

The maintenance of a comprehensive and effective office library is crucial to preparing specifications. The office library should contain:

- manufacturers' and suppliers' product literature;
- trade association handbooks and design guidelines;
- guides related to contractual and procedural information (such as CCDC Guides);
- research material which provides data on the performance of construction components, assemblies, and systems under various conditions;
- standards (which prescribe the manufacture, performance, and installation of various products);
- national and provincial codes and regulations;
- local bylaws and regulations (such as zoning bylaws).

In cases where a new or unusual product is to be selected, the architect will usually research the product and its specifications. Note that:

- the specifications can only be drafted after the quality and performance of the new product has been evaluated;
- it may be necessary to obtain samples or to conduct site visits where the product has been installed.

Although most manufacturers' representatives are knowledgeable about their products, the architect generally:

- seeks further information;
- reviews the firm's literature;
- asks for test reports from independent laboratories;
- contacts other architects or users who have had experience with the material or product.

Coordination

The architect continually acquires information affecting specifications, and maintains close coordination among all contributing parties during the process of writing the specifications. These parties include:

- the client representative;
- members of the architect's staff associated with the project;
- structural, mechanical, and electrical engineers;
- specialist consultants;
- technical representatives from materials and equipment manufacturers;
- Authorities Having Jurisdiction;
- testing agencies;
- trade associations;
- the cost consultant.

It is important to establish well-defined lines of communication for sharing information among the client, Authorities Having Jurisdiction, the architect's staff, and consultants.

Assembling Specifications Sections

The specifications can be assembled as the project design is developed and the components of the project are identified.

Architects may follow these steps:

- obtain a copy of the master specifications for the section if one is available (alternatively, if the section is new, have

a copy of *Three Part SectionFormat™ for Construction Specifications* to assist in writing);
- review the minutes from project meetings and identify specification items;
- study the latest drawings and schedules and the use of the materials noted;
- attach a checklist to each section listing:
  - action required;
  - questions to be answered;
  - information to be obtained;
- draft the section, marking items to be resolved on the draft;
- coordinate all references to standards and codes to ensure that they are current and appropriate for the product or system application;
- coordinate with other sections and with drawings, when preparing each draft section;
- finalize the draft;
- edit and proofread the text;
- correct and reprint until a final copy is achieved.

Revisions

As the construction documents develop, the architect incorporates a number of revisions into the specifications. The final specifications include:

- design revisions affecting the materials to be used;
- revisions which change the methods by which a material is used;
- changes requested by local Authorities Having Jurisdiction, such as:
  - additional fire-rated protection;
  - the prohibited use of a material in a given situation.

Office Procedures and Standards

Each architectural practice will develop its own standards for formatting, text editing, word-processing, and producing the specification documents. Only the significant points are stated here. Refer to the *CSC Manual of Practice* for a detailed description of procedures.

SectionFormat™
The "section" of a specification is intended to cover a particular subject, component, or unit of work, of the project. The information and instructions contained in the section must be organized in a consistent manner, as recommended in *SectionFormat™*.

PageFormat™
The practice should develop a standard page format for specifications. Some editing software programs provide options which automatically change the page format.

The office standard should:

- maximize use of text area on the page;
- avoid excessive indenting of paragraphs;
- recognize that some clients may require a style and font that differs from the architect's standard.

The text for the printed page must be easy to read, and quickly and thoroughly understood.

Format:

- use the same layout and typeface (font) throughout the document;
- issue clear instructions on format to:
  - in-house staff;
  - consulting engineers;
  - specification writers.

The choice of font is also important for ease of communication. The base font should be easy to read. Provide variations, such as a small increase in size (for headings, for example), bold face, or italics, to emphasize certain components of the text or to highlight certain kinds of information.

Covers should present the practice's image in a professional manner.

Project identification:

- includes project name and contact information;
- includes project number;
- includes date:
  - usually selected by the architect as the completion date of all documents;
  - the date must be the same on **all** bid documents and **all** contract documents;
- is identical on all documents including:
  - drawing title blocks;
  - specifications cover;
  - specifications title page (particularly if cover is blank or contains graphics);
  - covers for separate volumes (schedules, standard details, etc.).

Reproduction and binding should take into account the fact that note specifications are used extensively at the construction site, often in rough conditions and sometimes wet weather.

For information on the number of sets to be printed, see Chapter 2.3.9, *Construction Procurement*.

Specification Language

When writing specifications, follow these well-known maxims:

- be brief and clear;
- use imperative style;
- address instructions to the contractor;
- avoid:
  - repetition;
  - specifying anything which is not to be enforced;
  - *or equal* phrases;
  - *scope* or *scope of work* paragraphs;
  - *weasel* paragraphs (see below).

Use technical terms in such a way as to be understood by a non-specialist. Specifications convey a message to the people responsible for building the project.

1. Use a simple imperative style. Avoid verb forms such as: s*hall be, will be, to be, is to be, are to be, should, should be,* and *may be*. Avoid the word *must*.

2. Make direct positive statements. Make materials and methods the main subject, not *the Contractor*. Write specifications as if the work will be done by **one** constructor. Avoid reference to: *Mechanical Contractor, Plumbing Contractor, Sub-contractor, General Contractor, Main Contractor,* etc.

3. Avoid vague or escape phrases, for example: *as specified, as shown on drawings, specified elsewhere, to the satisfaction of Architect, as Architect may direct, acceptable to Architect, in opinion of Architect*.

4. Avoid "weasel" paragraphs (such as the following actual examples):

   ~~*The contractor shall furnish and include everything necessary for the full and complete construction of the building whether shown or specified or not shown or specified.*~~

   ~~*Any work which would necessarily be required to properly carry out the plans must be considered as included in these specifications, although the same may not be specifically mentioned.*~~

5. Avoid superfluous words such as: *all, any, which, same, and/or*. Avoid using the definite article "*the*" ***or*** the indefinite articles "a" and "an."

6. Avoid the phrases: *workmanlike, high-class job, first-class job,* etc. Describe the end result in known precise terms. Do not specify anything not intended to be enforced or impossible to enforce. Avoid adverbs such as "carefully" or "neatly."

7. Use numbers for numeric quantities. (When a numeral or letter is used as a descriptor as in a list, add a period to distinguish it from a quantity.)

8. Use abbreviations or acronyms if they are well-known in the industry. (Consider including a glossary that spells out abbreviations or acronyms in full.)

9. Avoid the following phrases: *or equal, approved as equal, equal to,* or *just as good*.

10. Avoid repetition — say it once, in the appropriate place.

11. Avoid writing *scope, scope of work,* or *work included* paragraphs. There is a time-honoured rule of law which reads: "Expressio Unus est Exclusio Alterius." This means literally: *The express mention of one thing implies the exclusion of another*.

12. Ensure consistency in style and in the use of terms.

Complete sentences are not necessary in specifications. The information can be conveyed by simply naming the product and relating it to a standard or list of criteria.

For example: *.2 Acoustic units: to CAN/CGSB-92.1, 24" x 24", mineral fibre, 3/4" thick*
NRC range .65 -.75, colour white — face cut pattern

or: *.2 Acoustic units: 'Acoustone' Glacier, by CGC — colour white*

The Bid Package

Refer to "List: The Bid Package — A List of Information Required," Chapter 2.3.9, *Construction Procurement*.

Addenda

Addenda are revisions to the specifications and drawings prepared during the bidding period. Refer to Chapter 2.3.9, *Construction Procurement*.

Definitions

Bid Documents or ***Bid Package:*** The compilation of documents, issued by the architect, and used by bidders to prepare an offer to construct a project. The bid package consists of the following:

- bidding requirements (including instructions to bidders);
- contract forms;
- contract conditions;
- specifications;
- drawings (including schedules);
- addenda.

Division: A major element or heading of the specification under which are grouped sections describing similar and related work. The division contains no text except that which is presented in the sections. The MasterFormat™ system has 49 divisions.

Generic: This term means that the product is identified by a common name and, possibly, by general type.

Part: One of three parts in a section which deals with a particular aspect of the work described in the section. These three parts are called General, Products, and Execution.

Product or Products: The material, machinery, equipment, and fixtures forming the Work, but does not include Construction Equipment. (as defined in CCDC 2, *Stipulated Price Contract*).

Section: An element within a division which describes a particular unit of work.

References

Canadian Construction Documents Committee (CCDC). CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts*. Ottawa, Ont.: CCDC.

Construction Specifications Canada (CSC). Toronto, Ont.
www.csc-dcc.ca

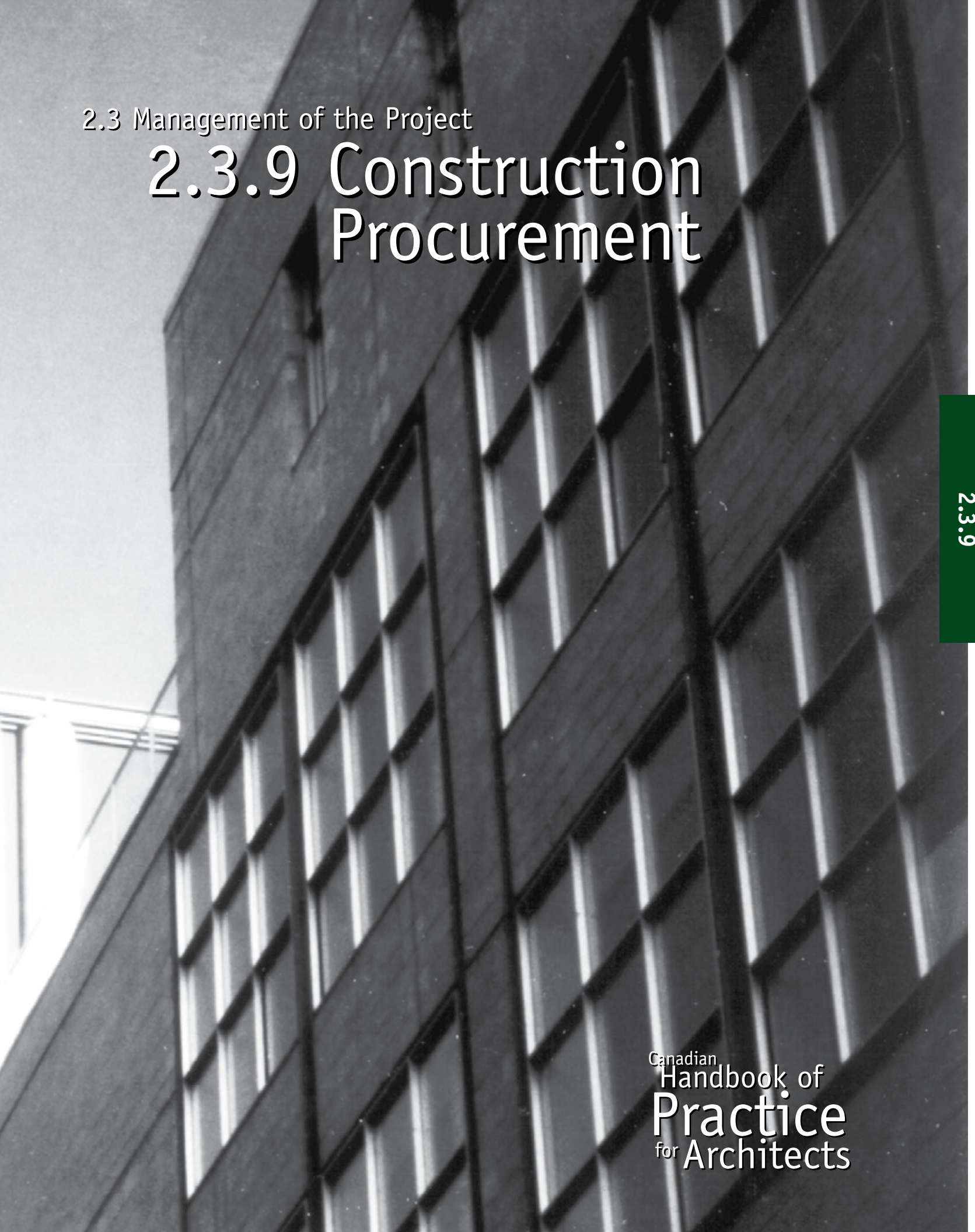
Construction Canada. A monthly journal.
Manual of Practice, 2006
An Alphabetized Word List of Definitions, Defined Terms, and a Glossary
SectionFormat™ / PageFormat™, 2008
MasterFormat™
UniFormat™
Specifier's Guide to Metric Conversion in Specifications
TEK.AIDs
Workbook for Product Representatives

Demkin, Joseph A., executive editor. *The Architect's Handbook of Professional Practice*. The American Institute of Architects. Hoboken, New Jersey: John Wiley & Sons, Inc. 2008.

Stitt, Fred A., *Construction Specifications Portable Handbook*. McGraw-Hill. New York, New York, 1999.

Checklist: Assembling and Writing the Specifications

- ❑ Attend all project team meetings, including those with consultants.
- ❑ Obtain and review a set of design development drawings and, if one has been prepared, a set of outline specifications. Obtain and review sets of partially complete working drawings and updates as soon as they are available.
- ❑ Prepare files marked for bidding requirements, contract forms, conditions of the contract, and Divisions 1 to 16.
- ❑ Select appropriate sections from *MasterFormat*™ to be drafted. Prepare preliminary table of contents.
- ❑ Print draft copies of master sections or suitable sections from a previous project.
- ❑ File the draft copies.
- ❑ Mark up or develop a checklist of information required.
- ❑ Draft, print, and distribute preliminary table of contents for review by project team.
- ❑ Draft or assemble specification sections manually, or draft and edit directly using word-processing software.
- ❑ Coordinate each section with other sections as applicable (including sections within Divisions 15 and 16).
- ❑ Submit drafts to clerical personnel for typing and application of text editing software, or print out directly from word-processing software.
- ❑ Proofread printed section(s).
- ❑ Print and distribute copies for review by project team.
- ❑ Review and revise project sections in accordance with:
  - comments from others;
  - latest drawings;
  - latest information received.
- ❑ Update the table of contents to match revisions and additions.
- ❑ Prepare title page which includes:
  - project name and address/location;
  - project number;
  - date.
- ❑ Prepare specifications cover.
- ❑ If required, print preliminary copies for client's review and comments. Revise as necessary.
- ❑ Coordinate printing of specifications. Securely bind specifications, including front and back cover.
- ❑ Assemble bid documents (described in Chapter 2.3.9, *Construction Procurement*).
- ❑ Review the drawings and specifications during bid period. Draft corrections of omissions and clarifications of inconsistencies. Advise other members of project team.
- ❑ Review all architectural items found, or raised as queries, during bid period. Collect structural, mechanical, and electrical items from consultants. Coordinate all items and prepare addenda. Number each addendum consecutively. Issue each addendum. (Refer to Chapter 2.3.9, *Construction Procurement*.)



2.3 Management of the Project

2.3.9 Construction Procurement

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- Open Competitive Bids (or Public Tender Call)
- Invited Competitive Bids (or Invited Tender Call)
- Direct Selection

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- Performance Bond
- Labour and Material Payment Bond

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Distribution of Bid Documents
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Bid Period and Bid Closing

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- Bid Types
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Definitions

References

List: The Bid Package — A List of Information Required

List: Instruction to Bidders — A List of Information to be Provided

Construction Procurement

Introduction

This chapter discusses various methods of **selecting** contractors and awarding construction contracts. For a complete guide to the bid process, refer also to CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts*.

Clients, with the help of architects, **select** a general contractor for construction projects by using one of the following common methods:

- open competitive bids (sometimes called public tender);
- invited competitive bids (sometimes called invited tender);
- direct selection.

In addition to contractor selection, there are a variety of other **contracting** methods as well as methods of project delivery. For these various methods, refer to Chapter 2.3.2, *Types of Construction Project Delivery*.

One of the architect's responsibilities under the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six*, is to "assist and advise the Client in obtaining bids and negotiated proposals and in awarding and preparing contracts for construction." This service may be extensive. On the other hand, if the client is an expert in construction procurement, this assistance may be limited to only providing information and advice.

Obtaining Bids

At the outset of the project, the architect and the client must determine:

- the form of project delivery;
- the type of construction contract;
- the method for awarding the contract.

These decisions affect:

- the architect's scope of services and fees;
- the project schedule;
- the preparation of construction documents and bid documents;
- the bidding process.

For example, a stipulated price contract, with a single bid call, is much simpler to manage than a contractual arrangement with multiple bid packages at various stages of the project.

To ensure that all contractors are bidding on a comparable finished product, bidding for stipulated price contracts with general contractors occurs *after* all construction documents (including drawings and specifications) have been completed. All criteria for the selection of the successful bidder and award of contract must be included in the bid documents.

Open Competitive Bids (or Public Tender Call)

In this type of tender call, the bidders are not usually "screened" or otherwise pre-qualified, and the capability of the contractor may be uncertain. The contractor may be selected on price alone. This type of tender call is frequently used when the project involves public funds.

A Notice of Tender is often prepared and is advertised on various websites or electronic tendering services, in daily newspapers and construction journals. The Notice should contain the following information:

- name and location of project;
- name of the client and the architect;
- size and type of project;
- bid closing date;
- method for obtaining bid documents;
- bid security requirements (such as a bid bond or deposit);
- date and location of pre-bid meeting, if necessary;
- construction start and completion (if relevant);
- form of contract.

The Notice enables contractors to decide whether or not they are interested in the project.

Invited Competitive Bids (or Invited Tender Call)

When inviting bidders, the client may select contractors with whom the architect or the client has had a satisfactory experience; alternatively, the client and the architect may select bidders by pre-qualification. Architects often assist the client in assessing the capacity and previous record of contractors and sub-trades who might be invited to bid on the work.

At the outset, pre-qualification helps to eliminate candidates who do not demonstrate that they have the necessary financial capacity, relevant experience, and human resources for the project at hand. Refer to CCDC 11, *Contractor's Qualification Statement*. Once pre-qualified, bidders should generally be considered to be equal in competence and the contract should then be awarded to the lowest bidder.

Prequalification can have its pitfalls, and architects may wish to establish and use clear and transparent criteria when selecting or eliminating contractors to avoid being accused of favoritism.

Invited bids are typically used for the following projects:

- projects with private clients who prefer to select from a group of proven contractors;
- specialized projects that require particular expertise;
- small projects that might not attract the attention of contractors if they were advertised publicly.

Direct Selection

It is always possible for clients to negotiate a contract with a single contractor, especially a contractor with whom a relationship of trust has been established over time. Clients and architects (possibly with the assistance of a quantity surveyor) should ensure that detailed construction cost estimates have been prepared as the basis for beginning negotiations. During negotiations, the contractor may propose changes or alternatives which must be evaluated and agreed upon. Negotiated contracts are based on mutual trust and full disclosure of all estimates and quotations. Direct selection and negotiation often lead to the following forms of construction contract:

- stipulated price (such as CCDC 2, *Stipulated Price Contract*);
- cost plus, or cost to a guaranteed maximum price (such as CCDC 3, *Cost Plus Contract)*;
- construction management contracts.

Bonds

In the construction industry, a bond is an instrument which permits a contractor to provide an owner with a guarantee from a bonding company, known as a surety. The guarantee ensures that the contractor satisfactorily performs his/her obligations under a contract. Bonds are a "useful means of ensuring responsible contract performance and financial security and, consequently, are often an essential requirement in construction procurement today" (CCDC 22, *A Guide to Construction Surety Bonds*). A bond is not an insurance policy but instead a three-party undertaking whereby the surety agrees to indemnify the owner against loss arising from the failure of the contractor to perform obligations under contract.

The architect should be familiar with the various types and applications of bonds in the construction industry. Refer to CCDC 22, *A Guide to Construction Surety Bonds*, for further information.

In preparing the bid documents, the architect may advise the client of the type and amount of bonds appropriate for the project. For construction contracts, three bonds are of particular importance:

- bid bond;
- performance bond;
- labour and material payment bond.

Bid Bond

The bid bond submitted by the contractor (bidder) guarantees that if the bid is accepted within the time period stated, the contractor will enter into a formal contract with the owner. If the contractor fails to enter into a contract, the surety will guarantee — up to the amount of the bid bond — to pay the difference in money between the amount of the contractor's bid and the amount for which the owner legally contracts with another contractor for the project. Bid bonds are usually between 5% and 10% of the estimated construction cost; on very large projects, 2½% is considered an appropriate amount.

The architect may wish to consider other forms of bid security:

- certified cheque;
- irrevocable letter of credit from a financial institution;
- negotiable securities (in rare instances).

Frequently, smaller contractors — who do not have the financial capacity to obtain bid bonds — may be appropriately qualified for small or specialized projects. In these cases, other forms of bid security should be considered.

If a bid bond is selected as the appropriate form of bid security, the use of CCDC *Form 220, Bid Bond*, is recommended.

Performance Bond

The function of a performance bond is to indemnify the owner up to the amount of the bond in the event of default (bankruptcy or insolvency) on the part of the contractor. In the event of a contractor's default, the performance bond will cover the costs of completing the contract as well as other costs for which the surety is liable, up to the total amount of the bond. Frequently, the amount of a performance bond is based on a percentage of the contract amount, such as 50% or 100% of the contract amount.

Bid bonds do not ensure that a surety will provide the necessary performance bond once the bid is accepted; therefore, it is prudent to request a separate undertaking signed by a surety company to issue a performance bond if the contractor is awarded the contract. This undertaking is usually in the form of a letter signed by the Surety and may be called a "Consent of Surety" or "Agreement to Bond" or "Bid Letter".

A performance bond will not cover payment of labour and material claims.

The use of CCDC *Form 221, Performance Bond*, is recommended for performance bonds; however, many sureties have their own type of documentation.

Labour and Material Payment Bond

A labour and material payment bond guarantees that claimants (sub-contractors, sub-trades, and suppliers who have direct contracts with the contractor) will be paid for labour and materials provided to the contractor for use on the project identified in the bond.

The use of CCDC *Form 222, Labour and Material Payment Bond*, is recommended; however, many sureties have their own type of documentation.

Refer to CCDC 22, *A Guide to Construction Surety Bonds*, for further information.

Preparing the Bid Package

The package sent to bidders to prepare their bids is made up of the components outlined at the end of this chapter. See "List: The Bid Package — A List of Information Required."

In preparing the bid package, the architect should refer to CCDC 23, a *Guide to Calling Bids and Awarding Construction Contracts*. The excessive use of Supplementary General Conditions should be avoided in the preparation and use of CCDC documents. The CCDC will not endorse any Supplementary General Conditions; the modification of CCDC contracts by way of addition, deletion or revision should be kept to a minimum and only considered after thorough review. Users are cautioned to avoid arbitrary revisions which may weaken the documents' provisions and also create serious problems.

Occasionally, special circumstances require special bid packages and additional information for the bidders. Architects may need to provide bidders with information on the details of pre-awards, pre-purchased materials, and the responsibilities which the successful bidder must assume. (Refer to the "Definitions" at the end of this chapter.)

Some examples include:

- special insurance and indemnification requirements;
- the client decides to advance construction by awarding a construction contract(s) for a portion of the work, such as foundations;
- some materials or products or systems are pre-purchased for incorporation into the project;
- pre-award contracts for structural steel or certain mechanical and electrical components;
- some equipment has been purchased directly for future installation in the building (this is typical for hospital equipment which must be installed under sub-contract to the general contract).

Refer also to Chapter 2.3.8, *Construction Documents — Specifications*.

Privilege Clauses

In the past, it was customary for owners and architects to exercise some control over the tendering process by inserting a "privilege clause" in the bid package. A typical privilege clause read as follows:

> *The lowest or any tender shall not necessarily be accepted.*

This type of clause is no longer appropriate. It was believed that this clause allowed owners to justify a decision to award a contract to someone other than the lowest bidder. A decision from the Supreme Court of Canada, issued in April 1999, has provided a final interpretation on this part of the law of tendering. Owners are expected to award a contract in accordance with the terms and conditions of the tender call and not to provide an unfair advantage to one bidder. Accepting a qualified or non-conforming bid is considered a breach of the duty of fairness to all other bidders. A privilege clause does not permit the owner to accept a non-compliant bid.

Architects should review Section 2.0, Principles of the Law of Competitive Bidding of CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts*.

In preparing tender documents, it is essential to indicate the following in the Instructions to Bidders:

- the requirements for a compliant bid;
- whether or not bids may be withdrawn and under what circumstances;
- whether or not, and the extent to which, pre-award negotiations will be permitted;
- all criteria for selection of successful bidder.

It may be prudent to look for direction from construction lawyers and from the provincial associations of architects for advice on the preparation of bid packages.

Distribution of Bid Documents

Usually, the Notice of Tender indicates where, and under what conditions, contractors can obtain the bid documents. The administration and distribution of the bid documents can be a service provided by the architect or alternatively, in the case of an experienced or sophisticated client, it may be the client's responsibility.

Number of Sets of Bid Documents

Clients, consultants, contractors, and sub-contractors all have vested interests in a having easy access to the drawings and specifications during the bid period. Limited electronic access or too few printed sets may reduce exposure of documents to sub-trades and suppliers, and perhaps reduce the number of competitive prices.

When determining how to distribute bid documents electronically and how many sets of hard or paper copies to print, architects should consider the following factors:

- requirements of the client and consultants;
- requirements of Authorities Having Jurisdiction;
- type and number of electronic tendering services, such as CANet and Merx;
- sets for construction association plan rooms;
- size and complexity of projects (number of trades involved);
- number of contractors and sub-contractors expected to bid;
- sets required for execution of the contract.

It is important to always issue complete, and not partial, sets of the bid documents.

Client-architect agreements should not stipulate the number of sets to be included in the fee. Printing drawings and specifications are reimbursable expenses. If clients insist that a minimum number of sets be included in the fee, the architect should adjust the fee accordingly. Fee arrangements should also be made for the formatting, dissemination, and distribution of electronic data.

Tracking the distribution of bid documents and addenda is important. A typical "Bid Documents Distribution List" is provided in Chapter 2.4, *Sample Forms for the Management of the Project*.

Deposit

Contractors customarily obtain bid documents by providing a deposit to ensure their safe return. The deposit amount is generally the cost to reproduce a full set of documents plus a nominal handling charge. The deposit is refunded when bid documents are returned within a specified

time, provided that the documents are complete and in good condition. Sometimes, documents are provided *at cost* plus an administrative charge to any general contractor, trade contractor, supplier, etc., without the return of any funds.

Construction Associations and Bid Depositories

Access to information is critical and should be easily obtainable to ensure the best bids. A complex or large project may require the distribution of extra or additional sets of bid documents or the use of an electronic tendering service. All bid documents may be provided to construction associations, particularly for large projects and for projects which have significant sub-trade components.

A bid depository is a facility operated by the local construction association to collect and register bids from sub-contractors and suppliers, and then transmit these sub-trade bids to general contractors. Usually, these quotations for the general contractors' use must be submitted within a specified time period before the bid closing. The rules may be confirmed with the local bid depository. Refer to Chapter 1.2.1, *The Construction Industry*, for a brief summary of the role of bid depositories.

Addenda

A detailed analysis of the documents by contractors, sub-trades, and manufacturers — in preparation of their bid — may reveal omissions or contradictions in the project documents or items which need clarification or correction. The architect and engineers may also discover inconsistencies or omissions. Additional products which are approved as alternatives may have been identified. Moreover, the client may wish to make minor changes to the project. When questioned about the documents, the architect should be careful to issue new information **only in writing** to all bidders and others, including construction associations, bid depositories, the client, consultants, and authorities.

In the cases described above, the architect should prepare "addenda" to the bid documents. The addenda modify or interpret the bid documents. The addenda may include both text and drawings, or text only. Each addendum should be numbered and dated, and becomes part of the contract documents when the construction contract is executed. Engineering addenda should be forwarded to bidders through the architect, and the numbering of these addenda should be integrated with the architect's system. The new information should be set out very precisely so that bidders know exactly what is original and what has been added, deleted or changed. All bidders should base their bid on the same information.

When organizing addenda, architects can assist bidders and contract administrators by following these procedures:

- identify all addenda by project name and project number;
- provide a date of issue for each addendum;
- number addenda consecutively;
- record the information in a logical order (following the sequence established in the drawings and specifications);
- use simple, clear instructions such as:
  - **Delete:**
  - **Add:**
  - **Revise to Read:**
- reference all attachments to the addendum, providing a drawing and detail number as well as the specification section followed by the article and paragraph number;
- refer to the attachment in the addendum.

A sample Addendum is provided in Chapter 2.4, *Sample Forms for the Management of the Project*.

The last opportunity for issuing an addendum should be no later than four working days before bid closing. The same written instructions should be received in a timely manner by all bidders. If this is not possible, consideration should be given to extending the bid period.

Bid Period and Bid Closing

To ensure that clients receive competitive prices, contractors must have adequate time to review the bid documents and to prepare a bid. The length of the bid period will vary, based on the project size and complexity. A large, complex project "out for Public Tender" may require four to six weeks for bidding, whereas a simple, small project by invited bid may only require two weeks. Market conditions can affect the bid period; for example, several projects being bid at the same time may require a longer bid period.

It is not recommended to receive bids in more

than one location. It is increasingly common for bids to be received electronically and architects are advised to refer to Section 7.8 of CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts,* for information on principles which apply when receiving bids electronically.

It is not recommended that bids close on a Friday or a Monday, nor immediately following or preceding a statutory holiday. Usually, the time for closing bids is mid- to late-afternoon. It is important to specify the time as *"before"* the hour, not *"on"* or *"at"* the hour. Here is an example of a well-worded instruction:

> **Bids must be received *before* 3:00 P.M. on Thursday, February 19, 2009.**

The person receiving the bid should time-stamp, date-stamp, and initial the bids on receipt at the designated place of closing. Bids received after the designated bid closing time should be returned unopened to the bidder indicating that it was a late bid. No reasons for the lateness (such as accident or traffic jam) can be accepted. On the other hand, if an external cause such as a snow storm has prevented the majority of expected bidders from tendering their bids, the closing of the bid call may be postponed, in which case the bids that were received should be returned to their senders unopened.

Ideally, bids should be opened soon after the bid closing time. Frequently, bids for public and for some private projects are opened with the bidders, or their representatives, present. Only the following information should be announced:

- bidder's name;
- the *base bid amount only*;
- the required bid security or bid bond.

Alternative prices and unsolicited prices should not be reported. Alternative prices require analysis; reporting them at this time could mislead bidders.

A form entitled "Summary of Bids" is provided in Chapter 2.4, *Sample Forms for the Management of the Project*. Both the architect and the client may find this form useful for recording bids during the bid opening.

Infrequently, after the bid closing, a bidder may notify the architect or the client that a serious mistake has been made in the bid and this contractor should be permitted to withdraw without penalty. However, the submission of a bid is a legally enforceable contract between the bidder and the owner. Based on the conditions of the "bid contract," bidders are unable to withdraw their bids during the period of irrevocability (usually the period provided for in the bid bond). To do so would permit the forfeiture of the bid deposit or bond. Legal advice is required in such an instance. CCDC 23 indicates that if "the bid-calling authority is satisfied as to the existence of a genuine and significant mistake, the bid should not be accepted and the bidder should not be penalized even though the Owner *may* have the legal right to accept the bid."

If only one bid is submitted, the architect should advise the client to consider returning the bid unopened, or negotiating with the sole bidder.

Refer to CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts*, for more information on bidding.

Analysis of Bids

If part of the agreed-to services, the architect may assist the client in analyzing the bids and reporting, however it is the client who will select the successful bidder.

The architect will carefully review each bid. Prior to reporting to the client, the architect should analyze and research:

- the completeness of each bid;
- the bid amount and the amount of value-added taxes such as GST, HST or QST;
- the proposed construction start date and schedule;
- inclusion of all addenda;
- sub-contractors listed, including follow-up of the references;
- manufacturers and suppliers listed with follow-up as required;
- alternatives;
- unit prices.

It may be helpful to follow up with the architects involved on previous projects given as references by the low bidders. Finally, the architect will carefully review and compare the financial impact of any alternatives or substitutions or unit prices.

The architect should report in writing the findings of the bid analysis, including a comparison of all price and bid information, and recommend a course of action (that is, usually the selection of a contractor that most closely meets the applicable criteria) to the client.

Bid Types

Bids are described in the following two terms:

- compliant bid;
- non-compliant bid, that is any irregular bid that might be considered informal, non-responsive, incomplete, improperly qualified or conditional.

Any bid is considered non-compliant if:

- it does not meet the basic requirements concerning confidentiality (for example, being in a sealed envelope);
- it does not indicate that the correct number of addenda were received and included in the bid amount;
- it is not accompanied by the requested bid bond or bid security;
- it is not properly signed or sealed;
- bonding requirements are not submitted (for example, "Consent of Surety" or "Agreement to Bond").

Refer also to CCDC 22, *A Guide to Construction Surety Bonds*.

Any bid deemed non-compliant should be rejected.

Over Budget

When the lowest of the formal bids is higher than the most recent construction cost estimates and the client does not wish to revise the budget or abandon the project, there are two possible solutions:

- if the difference is more than 15% of the latest approved construction cost estimate, the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six* states that architect, if requested by the client, will revise the construction documents and administer a new tender call, at no additional fee;
- if the difference is less than 15% of the latest approved cost estimate, it is generally possible to propose alternatives and to negotiate an acceptable price with the lowest bidder.

Contract Award

Letter of Acceptance

The award of a contract is usually accomplished by issuing a Letter of Acceptance from the client. This letter allows the contractor to start work immediately while a formal contract is drafted and executed. Bids must be accepted or rejected as submitted. The architect frequently assists the client in the preparation of the Letter of Acceptance; however, it is prudent to advise the client to have the Letter of Acceptance and the subsequent construction contract reviewed by the client's lawyer.

Chapter 2.4, *Sample Forms for the Management of the Project*, provides two sample Letters of Acceptance:

- Sample Letter 1: outlines some of the documentation required before commencing work on the site;
- Sample Letter 2: has some qualifications, notably the acceptance of certain alternative prices.

Some clients request that the architect assist them in issuing a "Letter of Intent" to the contractor to advise the contractor of the intention to award a contract. A Letter of Intent, which is issued with the intention of binding the contractor to the project with no real commitment, can be misleading. Letters of Intent should be avoided in favour of a Letter of Acceptance.

Notification of Unsuccessful Bidders

Unsuccessful bidders should be notified promptly of the contract award; this permits contractors to make arrangements with bonding companies, staff, and sub-contractors to bid on other projects.

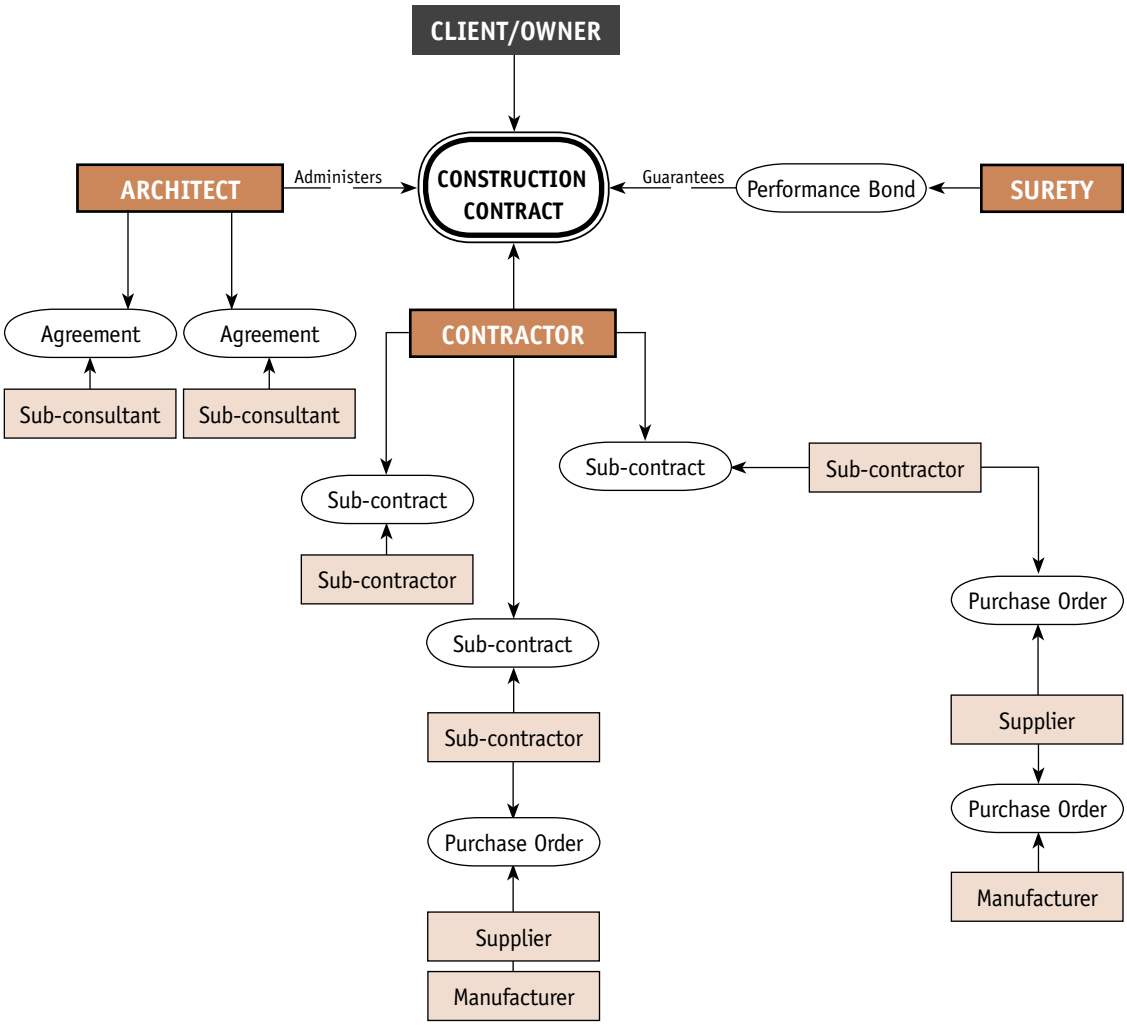
A sample Letter to Unsuccessful Bidders is provided in Chapter 2.4, *Sample Forms for the Management of the Project*.

Preparation of the Construction Contract

The architect usually prepares the construction contract. It is recommended that the standard Canadian Construction Documents Committee (CCDC) forms of construction contract be used. These documents have widespread acceptance in the construction industry, and have been tested and endorsed by all CCDC constituent members.

The Construction Contract

(Relationships in a Stipulated Sum Contract such as CCDC 2)



Refer to Chapter 1.2.1, *The Construction Industry*, for a description of CCDC and "List: Canadian Construction Documents."

The number of copies of the contract to be executed depends on the client and the client's lawyer. A minimum of two original copies (with CCDC authorization seals) should be prepared — one for the client and one for the contractor — as well as one photocopy for the architect. The signatures (and corporate seals) should be applied to both original copies. CCDC 20, *A Guide to the Use of CCDC 2*, describes the method for filling in and completing the agreement form in CCDC 2, *Stipulated Price Contract*.

Some lawyers recommend binding and sealing the documents to make it difficult to remove and replace pages without breaking the seal. Two sealing methods are:

- a ribbon or cord through each page with a wax seal on the cover;
- wire and lead seal.

Less formal methods may be acceptable for smaller projects.

To execute the contract, both the client and the contractor should sign and seal the covers of the documents including the cover page of the drawings and the specifications. Sometimes, every page of the supplementary conditions and occasionally all the drawings are initialled. A contract set is then provided to the client and to the contractor for their records.

Definitions

Addendum: A change to the bid package (usually a modification of the drawings and specifications) issued during the bid period and before execution of the contract.

Base Bid: The stipulated sum of money *without any adjustment as a result of alternative prices or substitutions, etc.,* for which the bidder offers to perform the work called for in the bid documents.

Bid or ***Tender:*** An offer in response to a bid or tender call; a price and/or time estimate in response to a bid or tender call; the offer forms a "bid contract" until the time period for acceptance is over. "Tender" and "bid" are used interchangeably; however, the CCDC formally abandoned the term "tender" in the early 1980s in favour of the term "bid."

Bond: A financial security for the performance of an obligation; usually a written document supported by a pledge of collateral.

Guarantee: a promise to answer for payment of a debt or performance of an obligation if the person liable in the first instance fails to make payment or perform the obligation (to be enforceable, must be evidenced in writing). *from the Carson's Construction Dictionary – Law and Usage in Canada*.

Pre-purchasing: A procedure for purchasing materials, equipment or services by the owner prior to award of the prime contract.

Pre-selecting: A procedure used by an owner to pre-qualify and select a manufacturer or supplier before the tender or award of the total contract.

Pre-tendering: A procedure for calling tenders by the owner prior to the prime contract tender call. The contractor may then be directed to include the amount of this pre-tender in his/her own tender.

Surety: The party (surety company) that issues a bond which guarantees the performance of the person bonded (in construction, the contractor) to fulfil obligations under contract within the financial and time limitations stated in the bond.

Warranty: a statement of fact or quality intended to be relied upon by another party, carrying with it an implied or express promise to make good any breach. *from the Carson's Construction Dictionary – Law and Usage in Canada*.

References

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.

CCDC 2, *Stipulated Price Contract*.

CCDC 3, *Cost Plus Contract*.

CCDC 5a and 5b, Construction Management Contracts.

CCDC 11, *Contractor's Qualification Statement*.

CCDC 20, *A Guide to the Use of CCDC 2 — 1994. Stipulated Price Contract*.

CCDC 22, *A Guide to Construction Surety Bonds*.

CCDC 23, *A Guide to Calling Bids and Awarding Contracts*.

CCDC 220, *Bid Bond (form)*.

CCDC 221, *Performance Bond (form)*.

CCDC 222, *Labour and Material Payment Bond (form)*.

Construction Specifications Canada (CSC). Toronto, Ont.
www.csc-dcc.ca

Manual of Practice, 2006

List: The Bid Package — A List of Information Required

1. Bid Information and Requirements

- Instructions to bidders (see list over)
  - Bid form[1]
  - Bid security requirements (bid bond, or other)
  - Undertaking to bond (agreement to bond, consent of surety, bid letter, etc.)
  - Pre-bid information and meeting

2. Contract Forms and Bond Requirements

- Model contract, including general conditions
- Supplementary conditions:
  - Insurance requirements
  - Performance bond, labour and material payment bond requirements, etc.
  - Cash allowances
  - Contingency allowances, if any

3. Specifications

- General requirements (Division 01)
- Technical specifications (Divisions 02 to 49)
- Independent testing and investigations requirements

4. Site Information (as per project requirements)

- Plan of public utilities
- Legal and topographic surveys
- Geotechnical report[2]
- Environmental report(s)

5. Drawings

- Drawings and details
- Schedules, including room finish schedules, door schedules, etc. (these may be bound with the specifications)

6. Construction Scheduling Restrictions and Milestones

- phasing and occupancy requirements

7. Addenda

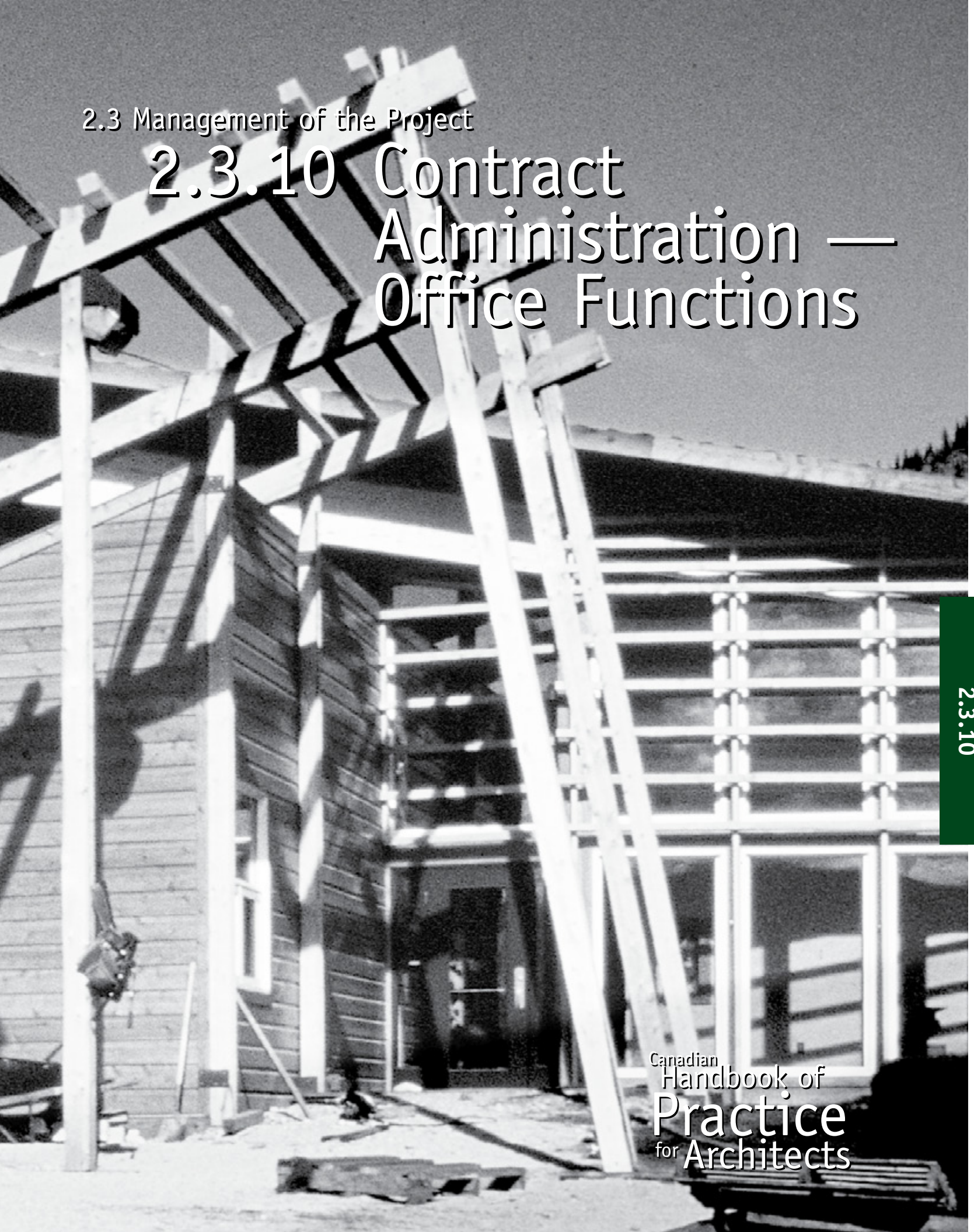
Footnotes:

1. Ensure that the amount of **tax** is clearly included or itemized.
2. Geotechnical and other reports are not generally provided to all bidders but may be consulted at architects' or engineers' offices. Refer to the *Recommended Guidelines for the Provision of Geotechnical Information in Construction Contracts*, published by the Canadian Construction Association and the Association of Canadian Engineering Companies.

List: Instructions to Bidders — A List of Information to be Provided

(refer also to CCDC 23)

- A copy of the project announcement and the invitation to contractors to submit bids (Notice of Tender)
- Location, date, and time of bid closing
- The legal names, titles, addresses, and contact numbers of the client and the client's representative
- The legal names, titles, addresses, and contact numbers of the architect and the architect's representative
- Location and address of the work
- Precise name of the project and a general description of the scope of the work
- Location where the bid documents may be obtained and the requirements for deposit
- Location or website where the bid documents may be examined
- Information regarding the use of bid depositories (when applicable)
- Information about the procedures for requesting information and the distribution of addenda
- Details of an information session or site visit, if required
- Details of a public bid opening (when applicable)
- Pre-qualification requirements
- Period of time for acceptance of bid (duration of offer)
- Bid security required (bid bond, certified cheque, letter of credit, or other)
- Other bonding or security requirements (agreement to bond, performance bond, labour and material payment bond)
- Instructions regarding amending the bid prior to bid closing time
- Details for the signature and witnessing, especially if not incorporated
- Identification of bid and security required for the submission (sealed envelope, name of bidder and name of project, etc.)
- Instructions concerning unit prices, and alternative prices.
- Criteria for the selection of the successful bidder and award of contract (such as price, duration of construction, experience)



2.3 Management of the Project

2.3.10 Contract Administration — Office Functions

2.3.10

Canadian Handbook of Practice for Architects

Introduction

Purpose of Contract Administration
- Role of the Architect
- Role of Others

Office Functions
- Prior to Construction
- During Construction
- At Close-out

Shop Drawings, Samples, and Mock-ups
- Shop Drawings
- Samples
- Mock-ups

Documentation
- Minutes or Records of Meetings
- Requests for Information
- Supplemental Instructions
- Change Orders
- Certificates for Payment
- Other Certificates

Definitions

References

Appendix A – Requests for Information

Appendix B – Processing Change Orders

Checklist: Typical Items for Shop Drawing Review

Contract Administration — Office Functions

Introduction

An architect looks out for the client's interests during construction through the services known as "contract administration." These services require a qualified architect or contract administrator who has tact and knowledge about construction. Many architects specialize in this field. Clients do not always value the professional services provided for contract administration, and sometimes try to reduce or eliminate the role of the architect during this phase. However, many jurisdictions now require professional involvement in the construction phase of most building types.

This chapter focuses on **office functions** under contract administration. It is important to understand that "office functions" support "field functions" undertaken during construction. Refer to Chapter 2.3.11, *Contract Administration — Field Functions*.

At the start of construction, in a traditional design-bid-build contract, a new participant — the contractor — is introduced to the project and takes on the responsibility and control of the construction. It is the contractor who assumes responsibility and control of the construction. The architect also takes on new responsibilities as described in the construction contract. These responsibilities support both the client and the contractor's interests in the successful completion of the construction phase.

With other forms of project delivery the architect's relationship with the contractor may vary. This chapter is written with the assumption that the architect is administering a stipulated sum contract for a project under a project delivery system using Design-Bid-Build and the architect is the prime or managing consultant for the building project.

Purpose of Contract Administration

Contract administration describes the services provided by the architect to fulfill the roles in standard construction contracts such as those duties outlined in General Condition GC 2.2 of CCDC 2, *Role of the Consultant*. The construction contract also describes their respective roles and obligations of the contractor and the owner. In addition, contract administration provides an opportunity for the architect to assist in realizing the project by providing the contractor with technical interpretations and information.

The resources, money, time, and effort invested in the development of the project, as well as the value of the completed work, require that the contractor's performance be monitored throughout the construction period.

The nature of the project, the type of construction contract, and the method of contract award as well as the architect's agreed-to services and fees all have a direct bearing on the level and nature of the monitoring that will be required. For example:

- an open and public tender, or a more technically sophisticated project in a fixed-price contract, will require more monitoring;
- a simple project, or a project under a cost-plus type contract awarded to one of a pre-selected list of contractors, may require much less supervision;
- a tight construction schedule will require more monitoring than one with fewer time constraints.

The nature and scope of the architect's services during the construction phase are defined by both the construction contract (such as CCDC 2) and the client-architect agreement (such as *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six*).

Role of the Architect

The nature and scope of the architect's services during the contract administration phase are outlined in the client-architect agreement. Furthermore, the architect's role is described in many construction contracts. For example, Part 2 of CCDC 2, "Administration of the Contract" clearly outlines:

- the authority of the "Consultant";
- the role of the "Consultant";
- the "Consultant's" role in correcting "defective work."

In addition, if the consultant is unable to resolve differences between the owner and the contractor regarding "the interpretation, application or administration of the contract," the consultant is obligated under "Dispute Resolution" (Part 8, CCDC 2) to provide instructions to prevent delays in the event of a dispute.

The architect's specific office functions include:

- representing and providing advice to the client;
- review of the construction schedule and contractor's schedule of values;
- preparing all documentation for the contractor and the client and others, including:
  - Supplemental Instructions;
  - Field Review Reports (refer to Chapter 2.3.11, *Contract Administration — Field Functions*);
  - Change Orders;
  - Change Directives;
  - summary of Change Orders;
  - certificates;
- coordinating the services of consultants;
- evaluating contractor's proposed substitutions and progress claims;
- reviewing shop drawings;
- reviewing operating and maintenance manuals at project close-out;
- rendering interpretations;
- follow-up with warranty items during the warranty period.

Sometimes, the architect may be responsible for recording minutes of site meetings.

Role of Others

Client
The client or owner is the entity which has entered into a contract with the contractor. The client's basic responsibilities are:

- providing financing information if required;
- making payments to the contractor;
- authorizing changes in the work;
- providing prompt decisions and directions.

Consultants
These may be sub-consultants engaged by the prime or managing consultant, that is, the architect, or they may be professionals engaged directly by the client through separate contracts. The prime or managing consultant's role includes the **coordination** of consultants.

Consultants assist the architect in office functions by:

- reviewing relevant shop drawings;
- interpreting their part of the contract documents;
- issuing supplemental instructions on their part of the contract documents;
- assisting in the preparation of Change Orders when required;
- reviewing their portion of the work to determine the percentage complete (which assists the architect in the preparation of Certificates for Payment);
- providing advice to assist the architect in the preparation of other certificates.

Contractor
As a party to the contract with the owner, the contractor is responsible for the execution of all the work, means, and procedures required to carry out the construction work as described in the contract documents.

Specifically, the contractor:

- studies the contract documents and fulfils all requirements including regulatory requirements to the extent provided for in the contract documents;
- supervises and coordinates the work of all trades and sub-contractors;
- executes the work by selecting all construction methods, techniques, sequences, etc.;

- is usually responsible for construction safety and all workplace regulations;
- pays for all labour, products, and sub-contracts.

Refer also to Chapter 1.2.1, *The Construction Industry*.

Office Functions

Office functions for the contract administration phase of a building include managerial work undertaken at the following stages:

- prior to construction;
- during construction;
- at close-out;
- during the warranty period.

Prior to Construction

Before the beginning of the construction phase, the architect carries out the following tasks:

- assists in the preparation of the contract form in duplicate for signing by the owner and the contractor;
- assembles the required number of sets of contract documents (refer also to Chapter 2.3.9, *Construction Procurement,* for details on the preparation of the contract);
- assembles and issues sets of drawings and specifications required by the contractor for the work;
- issues (in some cases) a set of updated documents showing all changes and revisions made during the bidding period to ensure that:
  - there is no confusion over the appropriate document;
  - no obsolete document remains in circulation.

The architect checks the contract documents, in particular, the General Conditions and the Supplementary General Conditions, for all required documents and information to be submitted by the contractor at commencement of work. These may include:

- performance bond;
- labour and material payment bond;
- insurance certificates;
- construction schedule;
- schedule of values for the parts of the work (which forms the basis for applications for progress payments).

Prior to mobilization, the architect should also obtain the following information from the contractor:

- complete list of sub-contractors and suppliers;
- statement of qualifications of contractor's site superintendent;
- proof of current standing of contractor (and sub-contractors) with the respective provincial or territorial health and safety agencies;
- required approvals from Authorities Having Jurisdiction for start-up;
- job-site accident prevention program;
- hazardous materials assessment (where applicable);
- list of personnel with authorized access to the construction site.

After a specified number of days following the award of the contract, the architect sometimes requires:

- a schedule of dates for submission and review of shop drawings;
- a site organization and hoarding plan;
- designs for temporary supports (such as shoring and underpinning, etc.);
- construction waste management plan;
- proof of the contractor's application for special permits and authorizations from Authorities Having Jurisdiction, public utility companies, etc.

[Note: the General Conditions of the construction contract require the owner to obtain and pay for the building permit. Frequently, the architect may apply for the building permit on behalf of the owner as soon as documents are issued for bidding, to avoid delay in the start of construction.]

Construction Schedule
Usually, the contractor is required to submit a construction schedule.

Construction schedules:

- set out the timetable for the construction work;
- indicate the contractor's intended construction methods and sequence;
- reveal the contractor's ability to successfully manage the work to meet the owner's

intended date of occupancy;
- identify owner-supplied equipment and coordination required for other separate contracts;
- expose shortcomings in planning and organizing.

The construction schedule should be carefully reviewed.

Scheduling methods vary from simple bar charts to complex critical path diagrams. The architect should become familiar with various methods, and select and specify the most appropriate method for the project.

Refer to the Appendix in Chapter 2.3.2, *Types of Construction Project Delivery,* for various types of construction scheduling.

During Construction

The standard stipulated-sum construction contract, (such as CCDC 2) and the client-architect agreement (such as RAIC Document Six) require the architect to:

- review shop drawings, samples, and product data submittals;
- provide timely interpretation of the contract by responding to Requests for Information and issuing *Supplemental Instructions*;
- prepare and issue *Proposed Change* forms in a timely manner;
- review the contractor's quotations prepared in response to:
  - *Proposed Changes;*
  - claims for additional costs initiated by the contractor;
- prepare and issue:
  - *Change Directives* if the adjustments to the contract price and time have not yet been agreed upon;
  - *Change Orders* once the adjustments to the contract price and time have been agreed to;
- review progress payment requests, usually on a monthly basis, in order to:
  - monitor progress of construction against the contractor's schedule;
  - compare the contractor's schedule of values with the actual work performed;
  - verify receipt of *Statutory Declarations and Certificates* from the respective provincial or territorial health and safety agencies such as the Workplace Safety and Insurance Board or Workers Compensation Board for the second and subsequent submissions;
  - prepare a *Certificate for Payment* and necessary documentation for progressive release of holdbacks and forward to the owner;
- provide support to field functions (refer to Chapter 2.3.11, *Contract Administration — Field Functions*):
  - prepare and distribute field review reports;
  - prepare agenda for special site meetings.

At Close-out

At the end of construction, the contract documents generally require the contractor to submit the following for review by the architect:
- municipal *Occupancy Permit;*
- an annotated set of record drawings and specifications showing all changes made during construction;
- manuals, incorporating the following data:
  - maintenance and operating instructions;
  - all warranties for materials, equipment, and products;
  - copies of all the permits and certificates of authorization issued by the various public utilities companies and Authorities Having Jurisdiction;
- final *Clearance Certificate* from the respective provincial or territorial health and safety agencies;
- *Statutory Declarations* for application for release of holdback from the general contractor and all sub-contractors;
- final reports on work carried out to correct deficiencies;
- a list of all contractors and trade subcontractors;
- replacement materials, maintenance products, special tools, etc.

The architect reviews the documents and submits them to the owner with comments or recommendations regarding their conformity with the contract requirements.

Refer to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations*, for tasks to be undertaken after the construction is substantially complete.

Shop Drawings, Samples, and Mock-ups

Shop Drawings

Shop drawings ensure and confirm the accuracy, size, and other specific data about a product or material prior to final purchase, fabrication or delivery. Shop drawings are prepared to indicate:

- accurate dimensions, size, quantity, and location;
- precise fabrication methods;
- construction and/or field erection techniques;
- information to coordinate related trades or adjacent work;
- elaboration on diagrammatic information;
- confirmation of the selection of options, such as colour or finish.

At the initial pre-construction meeting with the contractor, the architect usually establishes the standard procedures for submittal and review of shop drawings, samples, and mock-ups. Before submitting shop drawings to the architect for review, the contractor is responsible for verifying:

- quantities;
- dimensions;
- accuracy;
- completeness;
- compliance with the specifications.

The submission requirements and the format for shop drawings should be contained in the specifications. Certain shop drawings must be reviewed by the consultants. Shop drawings do not supersede the contract documents but **supplement** them to assist in the construction.

The review of shop drawings carries certain liabilities for the architect. The architect must take care to review only those portions of the shop drawings which relate to the architectural design. The consultants and engineers are responsible for reviewing their part of the design. The precise wording of the cover letter and application of notations to shop drawings is important.

Refer to Chapter 2.4, *Sample Forms for the Management of the Project*, for suggested use and wording of shop drawing cover letters and notations stamps.

It is also important to ensure the timely review and tracking of all shop drawings.

Refer to Chapter 2.4, *Sample Forms for the Management of the Project*, for the use of a "Log of Shop Drawings and Samples."

Samples

Samples provide the architect with an opportunity to review and finalize selection of patterns and other specified, colours, textures, etc., and to confirm specific design and aesthetic intentions prior to ordering a product. The architect may wish to be pro-active and request early submissions of all samples to avoid any impact on the price or delivery of the finish or material.

Mock-ups

Refer to Chapter 2.3.11, *Contract Administration — Field Functions*, for a discussion of mock-ups.

Documentation

The architect develops accurate and thorough documentation during the construction phase of the project. This documentation assists in providing:

- record of communication with all parties;
- a project history;
- documentation in the event of a claim.

Typical types of documentation include:

- formal correspondence and emails;
- minutes of meetings;
- Supplemental Instructions;
- Change Orders;
- Certificates for Payment;
- other certificates:
  - Certificate of Substantial Performance;
  - Letters of Assurance;
  - Statements of Completion.

Many of these standard forms for contract administration are available in CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*.

Minutes or Records of Meetings

The architect usually attends many meetings throughout the course of a project, and it is important that key decisions be recorded.

Minutes should be reviewed for accuracy and completeness and, minutes together with any amendments, should be distributed to all parties.

Refer to Chapter 2.3.11, *Contract Administration — Field Functions*, for a discussion of site meetings and for "Checklist: Suggested Agenda for the Pre-construction Meeting."

Refer to Chapter 2.4, *Sample Forms for the Management of the Project*, for a form and example of "Minutes of Meeting."

Requests for Information

A Request for Information (RFI) is useful throughout the design and construction of a building project as a tool for the owner, architect, contractor or other party to request information from each other that cannot readily be obtained through research, document review, or other reasonable means. During the construction phase of a project, the general contractor, who is unable to find the information through review of the contract documents, often seeks information from the architect or the architect's consultants. The RFI is a procedure for the contractor to request clarifications when the intent of the contract documents is:

- unclear,
- incorrect, or,
- information is missing.

For more information on Requests for Information and some possible pitfalls in using RFIs, refer to Appendix A – Requests for Information at the end of this chapter. For a sample form refer to Chapter 2.4, *Sample Forms for the Management of the Project* under Section 3, Forms for Contract Administration.

Supplemental Instructions

The architect (sometimes with the assistance of consultants) issues Supplemental Instructions to **clarify** or **interpret** the contract documents. Supplemental Instructions can also be issued to provide direction to the contractor concerning a problem which may have resulted during the course of construction.

If the Supplemental Instruction involves changes to the contract price or to the contract time, the architect should issue a Change Order or Change Directive.

Refer to CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*, for the information to be contained in a Supplemental Instruction and for a sample form.

Change Orders

Change Orders cover adjustments to the scope of work that require a change changes to the **contract price** or **contract time**. Sometimes the process for making changes can be demanding and time-consuming. Change Orders are required for the following reasons:

- additional requirements or changes in the requirements made by the client/owner;
- new or different interpretation of requirements by Authorities Having Jurisdiction;
- work not described in the contract documents;
- work inaccurately or incorrectly described in the contract documents;
- substitutions which may affect the contract time or contract price.

Proposed Change
The process is usually started by the issuance of a form known by one of the following terms:

- Proposed Change;
- Notice Of Change;
- Contemplated Change Order; or
- Change Notice.

CCDC recommends the term "**Proposed Change**." The purpose of this form is to alert the contractor to the proposed change and to provide the contractor an opportunity to submit a quotation for additional cost (or credit) or a change in time (if any) for the proposed change.

Change Directive
If the contractor's price cannot quickly be agreed to, the architect may issue a Change Directive if the proposed changes are within the general scope of work described in the contract documents. A Change Directive avoids delays and permits work to proceed while negotiations continue over the price of the proposed change.

Change Order
The Change Order is the final form which indicates the agreement between the client/owner and the contractor on specific additions, deletions or revisions to the contract documents.

Summary of Changes
Tracking and tabulating all Change Orders is important for two reasons: to establish the revised contract price (and time), and to process Certificates for Payment. Typically, all Change Orders are listed on a table or chart identifying all credits, extras, and the adjusted contract price.

Refer to CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*, for the information to be contained in a "Proposed Change," a "Change Order," and a "Summary of Changes," and for sample forms.

Certificates for Payment

In typical stipulated-sum construction contracts, the architect is responsible for preparing Certificates for Payment indicating when and how much a client must pay the contractor. Certificates for Payment are based on:

- the schedule of values agreed to and prepared at the start of construction;
- the architect's determination of the percentage of work completed, based on a field review;
- the applicable holdbacks required in the provincial or territorial lien legislation.

Schedule of Values
Usually the contractor submits a schedule of values at the start of the project. The schedule of values is typically sub-divided by divisions, major sub-trades or quantifiable elements related to the construction. The work performed by the general contractor's own forces — as well as the costs for mobilization, supervision, overhead, and profit — are usually indicated. The value of sub-trade contracts and sub-trade breakdowns assists in determining the appropriate Certificates for Payment and the progressive release of holdback monies for lien purposes.

The architect should review the schedule of values for completeness and for an accurate and realistic distribution of cost. It can be compared with the most recent construction cost estimate to identify significant discrepancies.

Percentage of Work Complete
Payments to a general contractor under a construction contract are usually made on a monthly basis in response to the contractor's submission of a "progress claim." The architect should conduct a field review to determine if the percentage of work completed corresponds with the contractor's progress claim. Any discrepancies should be discussed with the contractor in order to provide an opportunity to make changes to the progress claim or to identify work which the architect may have overlooked. Assistance in determining the percentage completed of certain structural, mechanical, and electrical components will require a field review and advice from the engineering consultants. Once the architect has determined a representative percentage, a Certificate for Payment can be prepared.

Statutory Holdbacks
The architect prepares a Certificate for Payment based on the percentage of work complete and the contractor's progress claim. Change Orders must be accounted for in the Certificate for Payment as well as the appropriate holdback required by the provincial oe territorial lien legislation.

Refer to Chapter 2.3.12, *Take-over Procedures, Commissioning and Post-occupancy Evaluations*, for a list of the appropriate provincial lien acts to determine the amount of holdback and requirements for release of holdback monies.

Refer to CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*, for the information to be contained in a "Certificate for Payment" and a "Schedule of Values" and for sample forms.

Other Certificates

The architect may be required to prepare other documentation attesting to the status of the construction contract and the actual performance of the work. Two common forms of certificates are listed below. Moreover, it is common for the architect to provide a variety of documentation to Authorities Having Jurisdiction attesting to the general conformity of the building to applicable codes and other regulations.

Certificate of Substantial Performance
In most provinces, the date of substantial performance of the construction contract must be documented. This certificate sets a date which triggers the beginning of the warranty period (as outlined in CCDC 2) and the release of holdback monies (lien funds) which have been

established to provide some financial protection to sub-contractors.

The architect must understand the lien legislation in the province or territory where the project is located and prepare a Certificate of Substantial Performance based on this legislation.

Refer to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations* for a list of the appropriate provincial or territorial lien acts to determine the amount of holdback and requirements for the release of holdback monies.

Letters of Assurance

A Letter of Assurance is required by a few provinces including of British Columbia, Alberta and Nova Scotia. All architects practicing in this province should refer to their provincial legislation and regulations and check with their associations for advice on the application of these certificates.

Letters of Assurance must be signed, sealed, and dated by registered architects who are practising (principals) in architectural firms or who hold Certificates of Practice in designated engineering firms. The purpose of a Letter of Assurance is to provide certification to Authorities Having Jurisdiction.

The standard forms of Letters of Assurance must always be used as provided in the British Columbia Building Code (or the Vancouver Building Bylaw's counterpart forms).

In British Columbia, the British Columbia Building Code standard forms of Letters of Assurance (or the Vancouver Building Bylaw's counterpart forms) must always be used.

Definitions

Certificate: A document attesting to the truth of a fact; in construction, a certificate is prepared by a professional, either an architect or an engineer.

Certificate of Substantial Performance: A certificate issued under the appropriate lien legislation attesting that the contract between the owner and the contractor is substantially complete.

Contract Administration: The services provided by an architect during the construction phase of a project. For stipulated construction price contracts, these services are outlined in detail in in one of the Schedules of Architect's Services which accompany the *Canadian Standard Form of Agreement Between Client and Architect: RAIC Document Six*.

Holdback: A percentage of the monetary amount payable under a (construction) contract, which is held as security for a certain period of time. The percentage and period of time are based on the provincial lien legislation.

Lien: A legal claim on real property to satisfy a debt owed to the lien claimant by the property owner. This claim can carry the right to sell the property upon default.

Shop Drawing: A drawing, diagram, schedule or data prepared on behalf of the contractor to indicate precise details of the construction materials, products or installation. Usually prepared by the "shop" or trade or manufacturer, supplier or fabricator responsible for the particular product.

References

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.
CCDC 2, *Stipulated Price Contract*.

CCDC 24, *A Guide to Model Forms and Support Documents*.

Demkin, Joseph A., executive editor. *The Architect's Handbook of Professional Practice*. The American Institute of Architects. Hoboken, New Jersey: John Wiley & Sons, Inc. 2008.

Mays, Patrick C. and B.J. Novitski. *Construction Administration: An Architect's Guide to Surviving Information Overload*. Toronto, Ont.: John Wiley & Sons, 1997.

O'Brien, James J. *Construction Change Orders: Impact, Avoidance, and Documentation*. New York, NY: McGraw-Hill, 1998.

O'Leary, Arthur. *A Guide to Successful Construction: Effective Contract Administration*. Los Angeles, CA: Building News Inc., 1996.

The Royal Architectural Institute of Canada.
Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six
www.raic.org/practice/contract_documents/document6_e.htm

Appendix A - Requests for Information

A Request for Information (RFI) is useful throughout the design and construction of a building project as a tool for the owner, architect, contractor or other party to request information from each other that cannot readily be obtained through research, document review, or other reasonable means.

This Appendix focuses on the uses of a RFI during the construction phase of a project, when the general contractor is usually seeking information from the architect or the architect's consultants and is unable to find the information through review of the contract documents. The RFI is a procedure for the contractor to request clarifications when the intent of the contract documents is:

- unclear,
- incorrect,
- or, information is missing.

RFIs can contribute significantly to the smooth progress of construction, particularly when they are submitted well in advance, giving the architect and consultants time to clarify or correct a potential problem before it becomes a matter that could delay the progress of the work.

A new form has been developed for this purpose, Request for Information, based on AIA Document G716 – 2004, and a sample is included in Chapter 2.4, Standard Forms for the Management of the Project under Section 3, Forms for Contract Administration.

In all cases, it is the responsibility of the architect to provide the information or answer, with input from consultants when appropriate, either by issuing a Supplemental Instruction if there is no change to the Contract Price or Contract Time or, if changes are necessary, by initiating a Proposed Change, followed by either a Change Directive or a Change Order.

Some general contractors abuse the RFI process by issuing an excessive number of unnecessary or "frivolous" RFIs. There are several possible reasons for this:

- to ask the architect is easier than taking the time to find information readily available within the contract documents;
- to attempt to transfer to the architect the contractor's responsibility for acts or omissions (refer to the General Conditions, GC1.3.2 and GC1.3.3 of RAIC Document 6, 2002);
- to imply non-existent errors or omissions in the documents to support claims for additional work;
- to set up circumstances to support subsequent unjustified delay claims; or
- to discredit the architect's competence while, at the same time, promoting the contractor's mastery of the construction process.

The prudent architect ensures that the client/architect agreement includes provisions for appropriate compensation by the client for additional work related to:

- changes to the Contract Price or Contract Time resulting from RFIs, or
- changes in scope initiated by the client.

Whatever the reason for the request, the architect is obliged to respond to every RFI, however frivolous, unjustified or unnecessary. As a result, the architect must commit a significant amount of time and effort in answering unnecessary RFIs, for which there is no established means of being compensated. It is not reasonable that the architect should have to absorb the related costs if a general contractor consistently abuses the RFI process, but it would also not be reasonable to expect the client to bear costs resulting from such unacceptable behaviour by the contractor.

In order to ensure that the architect will be reimbursed for the expense of responding to unnecessary RFIs issued by the general contractor, consideration should be given to adding the following Supplementary Condition to the CCDC 2 General Conditions, revising GC 5.8 Withholding of Payment to state:

- the architect may determine that certain RFIs issued by the contractor are unnecessary and shall, in responding to such unnecessary RFIs, give the reasons for the determination in each case;
- if the contractor continues to issue unnecessary RFIs, the architect, after having identified a minimum of five [for example] RFIs as unnecessary, will invoice the client for the additional administrative cost of responding to each of the subsequent unnecessary RFIs;
- the architect will notify the contractor and client each time such an additional administrative cost is charged;
- the client shall reimburse the architect for the monthly total of such additional administrative costs; and
- the monthly total of such additional administrative costs shall be charged to the general contractor by showing the monthly total as a credit on each subsequent Certificate for Payment. This constitutes a change to the contract price and must be handled as a Change Order.

In addition, the AIA Document G716 – 2004 Instructions, which accompanies the standard AIA form Request for Information ("RFI"), Document G716 – 2004, states under "Purpose":

> *"...The RFI is utilized to obtain information that the requesting party cannot obtain through research, document review, or other reasonable means. A RFI that is already contained or provided for in the contract documents may result in additional administrative charges ..."*

Appendix B – Processing Change Orders

Issuing **Change Orders** is the final step in the process of confirming and recording **changes in contract price** and/or **changes in contract time** for a construction contract. Refer also to page 6, *Chapter 2.3.10, Contract Administration – Office Functions* and to *CCDC 24 – a Guide to Model Forms and Support Documents*.

As soon as possible after realizing the need for a change, the architect should determine the cause or reason for the change, and then inform the client and all relevant consultants that the proposed change may result in a change to the:

- scope of services;
- project schedule; or
- professional fees.

Work by the architect or consultants on the preparation of the change documents should not proceed without written authorization from the client or owner.

The Ontario Association of Architects has developed a new **Agreed Change Form** for this purpose (OAA Practice Bulletin B.16, *Consulting Contracts, Managing Contractual Change* includes the background and recommended procedure for the use of this form).

Proposed Changes

When the need for a change occurs, the architect (and/or the appropriate consultant) prepares and issues to the contractor written and graphic documents, as necessary, to describe the proposed change or a notice of a change being contemplated. Although CCDC recommends the term "Proposed Change" many architects use the term "Contemplated Change".

Sometimes a contractor will claim that a clarification or interpretation in a Supplemental Instruction is a change. If a Supplemental Instruction identifies work that is deemed to be a change in price and/or time, the architect should obtain a quotation for the changes from the contractor. If the contractor's quotation is accepted, a Proposed Change is issued, assigned the next consecutive Proposed Change number, and entered on the Summary of Changes Form.

As documents are prepared, the architect must forward copies to the owner, contractor and relevant consultants with any necessary covering letters of explanation.

Change Directives and Change Orders

Once a quotation has been received, reviewed by the architect, and/or referred to the appropriate consultant for review, the architect then prepares documents for approval from the owner, and then instructs the contractor to proceed with the change, using either a **Change Directive** or **Change Order**.

A ***Change Directive*** is used when further time is required to finalize or negotiate the changes to the contract price and contract time, but work on the project cannot be delayed. The Change Directive authorizes the change in the work to proceed and indicates that the adjustment to contract price and contract time will be finalized later by Change Order. *A Change Directive may be issued to the contractor without a preceding Proposed Change when, for example, it is urgent that a change be authorized to proceed immediately* ***without*** *waiting for a quotation from the contractor. In these circumstances, the Change Directive is the initial document and therefore must include the detailed statement of the work required which is normally provided in a Proposed Change.*

A ***Change Order*** is used to authorize the change and adjust the contract price and contract time when the contractor's quotation is acceptable, or to confirm charges or adjustments to contingency or cash allowances in the contract.

The architect prepares the document (frequently an electronic form) and forwards it to the owner for signature. The owner returns an electronic copy with electronic signature to the architect, who forwards the copy to the contractor for signature. Copies of all signed documents, confirming acceptance and approval, are forwarded to all parties including relevant consultants.

Summary of Changes

When a Proposed Change is initiated, it should be entered immediately on a Summary of Changes Form, used to track the status of all changes. This document is an important tool for the architect to manage a process which can become chaotic if it is not closely monitored.

The sample Summary of Changes Form in CCDC 24 is adequate for many projects. However, for larger or more complex projects, an expanded Summary of Changes in spreadsheet format is recommended, with headings for recording dates for every step in the process. A sample of this form is included in *Chapter 2.4, Standard Forms for the Management of the Project*. The form should include the following information:

- ***Proposed Change or Change Directive:***
  - number (as below)
  - brief description of content;
  - action columns, noting dates of:
    - issue;
    - receipt of quotation;
    - transmission to consultant for review, noting name or discipline and deadline for response;
    - receipt of comments from consultant;
    - return of an unacceptable quotation to contractor with a request for revision, noting deadline for their response.

  (Note: Record additional iterations of receive/review/return, which may occur with complex changes, in same columns, noted rev.1, rev. 2, as needed)

- ***Change Order:***
  - number (as above);
  - date of issue;
  - change in contract price (extra or credit) and, if charged to allowance, identifying which;
  - change in contract time.

- ***Remarks*** (for example, identifying a Supplemental Instruction that becomes a Proposed Change).

Numbering and Cross-Referencing Documents

There are two methods typically used by architects for assigning numbers and recording changes. The architect should use the selected method consistently.

1. The first method involves assigning consecutive numbers to each document in the change process as they are prepared, *using a separate numbering sequence for each document type* (separate numbering for Supplemental Instruction, Proposed Change, Change Directive and Change Order) and entering the number on the Summary of Changes Form. Since the timing of the change process is unpredictable, some architects believe it is not practical to attempt to retain the same number for each of the successive documents dealing with a specific change. Instead, referencing the number(s) of the preceding document(s) is done to assist in tracking the change process. For example, the first line of Change Directive 10 could be *Refer to Proposed Change 6*; then when the changes in contract price and time have been agreed, Change Order 14 begins *Refer to Proposed Change 6 & Change Directive 10*. Often grouping Proposed Changes to form a single Change Order makes sense in balancing credits and extras, and this may be better received. Approved change orders are consecutively numbered to avoid gaps when a proposed change does not proceed beyond pricing.

2. Many architects and large clients prefer to create a separate file and number for each document type in the change process and *to keep the same number assigned to the change throughout the approval process*. It is simple and easy to track each change with its own unique number and this avoids incorporating several Proposed Changes under one Change Order (for example, Proposed Change No. 8 automatically becomes Change Order No. 8). If a proposed change is abandoned it is simply recorded as cancelled and the number remains. This makes tracking of the process easy. Again, the Summary of Changes Form should be completed immediately recording all changes.

Recording Change Orders on Certificates for Payment

Each monthly Certificate for Payment states the current value of the contract in the section headed, "Contract Summary", by adding the net total price of all changes agreed to up to the date of the Certificate for Payment, including:

- Change Orders issued; plus
- the current value of work under Change Directives certified.

The "Contract Summary" section in the model Certificate for Payment Form in CCDC 24 proposes showing the net total price, only, of all Change Orders issued previously, including the current month; there is no space for providing details of the change in price for each of the current changes. The Guideline to the Certificate for Payment Form in CCDC 24 advises, however, that the method of presenting this information should be revised as necessary to suit the many variations in accounting used for this process.

Architects *may* prefer to present more detail on the Certificate for Payment, rather than preparing a separate detailed summary each month for attachment to the Certificate. For example, a summary of the status of Change Orders would list, on separate lines in the Contract Summary section on the Certificate itself:

- the **total** price of changes issued previously;
- changes issued during the preceding month, each listed separately, showing:
  - the Change Order number; and
  - the increase or decrease in the contract price;

The **net total** of the current month's issued Change Orders is shown in the totals column.

Construction contracts frequently include a Contingency Allowance, against which the price of each Change Order is charged or credited. The Guide to the CCDC 24 Certificate for Payment Form contains an example showing a method for reporting these charges when this type of contract is used.

Adjustments to all Allowances are made at the end of the work to determine a final Contract Price by issuing Change Orders that credit the unspent balance remaining in the Allowances or add any over-run.

References

Canadian Construction Documents Committee (CCDC). Ottawa, ON
CCDC 24, A Guide to Model Forms and Support Documents (for use with CCDC 2 – 1994). 1996

Ontario Association of Architects (OAA). Toronto, ON
Practice Bulletin Number B.8h, Ontario Joint Standard Practice Committee (OJSPC) Agreed Item 8, Change Procedures. July, 1998

Practice Bulletin Number B.16, Consulting Contracts, Managing Contractual Change. October 2004
Agreed Change Form [includes new standard form for use by architect]

Practice Bulletin Number C.5, Certificate for Payment. October 2004
Certificate for Payment [filled in as sample]

Checklist: Typical Items for Shop Drawing Review

This list is NOT all-inclusive, but it does suggest certain typical elements which may require shop drawings. The list also indicates some parts and features of the shop drawings which may require review by the architect and the engineers. The list is extensive and not typical for most projects. [Note: this list also includes some samples and mock-ups.]

Product or System	Items to review	Review by:
Division 01. General		
Building Layout (surveyor's drawing)	- general layout - dimensions	Architect
Construction Sign and Hoarding Drawings	- design - colour - construction - location - dimensions - capacity of sign to withstand lateral forces from wind loads	Architect Structural Engineer
Scaffolding	- general layout and location - design and connections	Architect Structural Engineer
Division 31. and 32. Site Work		
Excavation: (shoring, bracing, and sheet piling)	- location - design, including calculations - construction - dimensions - levels	Architect and Structural Engineer Structural Engineer
Piling: (caissons and piles)	- locations - dimensions and sizes - reinforcing - welding - design - transition caps - concrete strength - elevations and levels - as-built drawings	Structural Engineer
Site Furnishings	- colour - finish - layout and dimensions	Architect
Pre-cast Curbs	- dimensions and sizes - shape - holes for ground rods - locations and quantity - finish - weep holes	Architect
Pre-cast Unit Pavers	- dimensions and sizes - shape - finish - joint details and location - extent of unit pavers - materials - base and/or support	Architect

Product or System	Items to review	Review by:
Division 03. Concrete		
Cast-in-Place Concrete	- reinforcing (size, location, quality) - location of elements - concrete strength - dimensions of elements - opening sizes - spans - footing levels - stepped footing	Structural Engineer
	- construction joints - expansion joints - slab depressions - recesses - form tie pattern and spacing - dimensions - size and location of openings - waterproofing recesses and joints - stepped walls - weep holes - mechanical and electrical services locations	Architect
Pre-cast Concrete	- reinforcing (size, location, quantity) - connection and bearing details and location - concrete strength - provisions for lifting	Structural Engineer
	- materials - dimensions and sizes - shape - location - finish and colour (sample) - drips - reglets - joint details - anchor bolts and/or inserts for other materials - waterproofing - openings - mechanical and electrical services locations	Architect
Division 04. Masonry		
Masonry Walls (mock-ups sometimes required)	- masonry units - mortar colour and texture - joint tooling technique - joint size - coursing - masonry ties	Architect

Product or System	Items to review	Review by:
Division 05. Metals		
Structural Steel	- grades of steel - anchor bolt plan layout and dimensions - dimensions and sizes of members - specific deviations from grid lines - heights and levels of beams - connection details - base plate details - anchors required for other materials - size and location of openings through members - bearing details - expansion joint details - painting - framing around openings - lintels - provision for future additions - fireproofing (sample)	Structural Engineer
	- dimensions - method of fireproofing (sample) and/or rated assembly - finish (sample)	Architect
Steel Joists	- engineering certificate - sizes - spacing and location - bearing details - bracing and/or bridging locations - bottom chord extensions	Structural Engineer
	- mechanical services locations - finish	Architect
Metal Decking	- type - gauge of metal - finish - fastenings - location of openings and framing - location and details of closure plates - loads	Structural Engineer
Metal Fabrications, Miscellaneous Metals, Metal Stairs and Railings, Ornamental Metal	- location - dimensions and sizes - finish - hangers and fastening details - construction and installation - material - railing expansion joints - compliance with codes with respect to resistance to horizontal and vertical loads	Architect
Load-bearing Metal Stud Framing	- gauge and galvanic finish - spacing - connection details	Structural Engineer

Product or System	Items to review	Review by:
Division 06. Wood and Plastics		
Timber Framing and Prefabricated Structural Wood	- engineering certificate - sizes - spacing and location - bearing details - bracing and/or bridging locations - connections	Structural Engineer
	- finish - exposed connection design - mechanical services locations	Architect
Architectural Woodwork and Millwork	- design - dimensions and sizes - location - material (species, grain direction, and pattern) - finish (sample) - mechanical and electrical services locations - construction and installation - hardware and location - interference between hardware and door or drawer operation - plastic laminate (sample)	Architect
Division 07. Thermal and Moisture Protection		
Metal Cladding	- profile - material construction - finish and colour - dimensions and sizes - openings - installation details - fixing details to structure - cladding support system - weatherproofing (flashing, sealing, etc.)	Architect
Roof Insulation (tapered)	- thickness - locations of penetrations - slope	Architect
Exterior Insulation and Finish Systems	- insulation - colour (sample) - finish (sample) - expansion and control joints - decorative features - reinforcement details	Architect

Product or System	Items to review	Review by:
Division 08. Doors and Windows		
Doors and Frames	- material - construction - finish - location - dimensions and sizes - size of undercut - glass and louvre openings - finishing hardware locations - door swings - frame profiles - frame installation details - fire ratings - bumpers	Architect
Aluminum Doors, Frames, and Screens	- location - type - dimensions and sizes - frame profile - anchorages - location with respect to wall thickness - transom panel - finishing hardware location - door swings - construction - grilles - finish - gauge of material - bumpers - reinforcing for hardware - astragal - rebate sizes - stop location and size - door head frame wide enough for specified hardware - glazing - fire ratings	Architect
Windows	- profile - sizes - material - finish - location in relation to wall thickness - sealant at perimeter of frame - anchorages - tolerances for structural movement, especially at head - material thickness - insect screen - opening and locking mechanism - weeping holes - glazing (type) - weather bars if specified - sill detail - fixed and operable window section	Architect
Hardware (schedules)	- type - finish - location - function - fire rating - keying system - electrical requirements	Architect Electrical Engineer

Product or System	Items to review	Review by:
Division 09. Finishes		
Generally, shop drawings are not supplied, unless required, except for special treatment such as travertine walls, marble floors, etc., where joint lines and grain direction are important. All finishes are normally approved on the basis of material **samples** submitted to the architect for reviewing against the specifications and colour schedule.		
Special Finishes or Treatment	- material - finish - location - extent of application - joint type location, size, and detail - panel sizes - grain direction and pattern - base, ceiling, and corner details - fixing and location - location and size of openings	Architect
Carpeting and Resilient Flooring	- location - access to electrical underfloor duct system - installation and accessories - seam locations and pattern direction	Architect
Division 10. Specialties		
Manufactured Specialties	- finish and colour - location - fixing details - construction - dimensions and sizes - material - gauges - dimensions and sizes	Architect
Washroom Accessories	- type - finish and colour - fixings - construction - materials - gauges - dimensions and sizes	Architect
Toilet Partitions	- location - type - dimensions and sizes - material - finish and colour - reinforcing for accessories - door swing - hardware - construction - gauges	Architect
Signs and Directories	- location - dimensions and sizes - construction - finish and colour - material - fixings - electrical and mechanical services locations if applicable - access - glazing - lettering	Architect

Product or System	Items to review	Review by:
Division 11. Equipment		
Special Equipment (e.g., kitchen equipment, computers, controls, machinery, lifts, etc.)	- location - clearances required around equipment for maintenance - access for replacement	Architect
	- loading and vibration - dimensions and sizes - finish and colour - installation details (isolation — structure, sound, heat)	Structural Engineer
	- mechanical services, sizes, and location	Mechanical Engineer
	- electrical services, sizes, and location	Electrical Engineer
Division 12. Furnishings		
Blinds and Window Treatment	- type - finish and colour - fixings - dimensions and sizes - operation	Architect
Division 13. Special Construction		
Special Construction	- location - extent - material - dimensions and sizes - construction - finish and colour - installation - clearances - presence of electrical services - presence of mechanical services	Architect

Product or System	Items to review	Review by:
14. Conveying Systems		
Elevators, Lifts, and Dumbwaiters	- shaft construction - shaft sizes - clearances and heights - door frame details and finishes - cab sizes - design and finish of cab - design, finish, and location of name plates, push buttons, hall indicators, etc. - equipment location - shaft projections - number of stops - operation (fire fighter's elevator)	Architect and Structural Engineer
	- imposed loads - sizes of structural members, hoist beams, etc. - bearing of load capacity members	Structural Engineer
	- shaft and machine room ventilation requirements	Mechanical Engineer
	- electrical services and equipment and location of same	Electrical Engineer
Escalators	- location - size of floor openings - escalator dimensions - material - finish and colour - access - installation details with respect to adjacent areas - clearances around escalators	Architect and Structural Engineer
	- imposed loads - sizes of structural members, hoist beams, etc. - bearing of load capacity members	Structural Engineer
	- electrical services and equipment and location of same	Electrical Engineer
Pneumatic Tube System	- tube runs and tube sizes - station location - station design - materials - finish and colour - operation and speed - construction - openings required in structure - exhaust and its location - station interconnections - accessories such as carriers, speed controllers - type of sending and receiving terminals - station access for maintenance	Architect
Conveyors	- shaft dimensions - shaft construction - conveyor routing - material - finish and colour - clearances - dimensions and sizes - access for maintenance - operation - number of stations and location	Architect

Product or System	Items to review	Review by:
Divisions 21., 22., 23. Mechanical		
Sprinkler Systems	- location and spacing - finish - special requirements	Architect and Mechanical Engineer
	- conformity with NFPA and insurance underwriter standards - pressure and flow - calculations based on correct data - design - equipment and pipe sizes - water storage tanks, pumps, valves - sprinkler control trees - clearances, access - supports, foundations	Mechanical Engineer
Plumbing Fixtures	- colour - controls - mounting and installation requirements	Architect and Mechancial Engineer
	- quantity - roughing-in requirements - connections	Mechanical Engineer
HVAC Units	- size and weight	Structural Engineer
	- location and required openings	Architect and Mechanical Engineer
	- all performance data	Mechanical Engineer
	- controls and electrical requirements	Electrical Engineer
Boiler Room Equipment (boilers, pumps, tanks)	- size and clearances - installation and mounting requirements - louvres and ventilation sizes	Architect. Structural and Mechanical Engineer
	- size and weight - location of openings - clearances, heights	Structural Engineer
	- all performance data	Mechanical Engineer
	- controls - power, panels, shut offs	Electrical Engineer
Diffusers	- colour - finish	Architect
	- louvre direction - other features (dampers, etc.)	Mechanical Engineer

Product or System	Items to review	Review by:
Divisions 25., 26.,27. Electrical		
Light Fixtures	- quantity - colour - finish - options - location - lamps	Architect
	- lamps - performance and installation	Electrical Engineer
Distribution Equipment	- location and size - clearances	Architect
	- all features	Electrical Engineer
Fire Alarm System, Security System, and Communications System	- location of components - size and colour	Architect
	- all features - quantity - rough-in requirements	Electrical Engineer



2.3 Management of the Project

2.3.11 Contract Administration — Field Functions

2.3.11

Canadian Handbook of Practice for Architects

Introduction

Purpose of Field Review
- Role of the Architect
- Role of Others During Construction
- Construction Safety

Conducting a Field Review
- Procedures
- Frequency and Timing of Site Visits
- Field Locations
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- Mock-ups

Site Meetings
- Pre-construction Meeting
- Regular Site Meetings

Field Review Services of Consultants
- Engineers and other Consultants
- Testing Agencies and Inspection Services

Continuous On-site Representation

Definition

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Appendix A — Tips for Site Observations

Appendix B – Professional Standards for Field Review / General Review

Checklist: Suggested Agenda for the Pre-construction Meeting

Checklist: General Items for Field Review

Checklist: Final Field Review

Checklist: Architect's Role in Soils and Materials Testing

Contract Administration — Field Functions

Introduction

The field functions of contract administration are done concurrently and in coordination with a variety of office tasks. Refer to Chapter 2.3.10, *Construction Administration — Office Functions*, for a description of the office work that supports field functions.

The terms used to describe the functions performed by an architect during the construction — or contract administration — phase of a project, on site or out of the office, are:

- field review;
- general review;
- site review;
- site observations.

The terms *"supervision"* and *"inspection"* refer to completely different levels of service **not** normally provided by an architect.

- "Supervision" implies the overseeing of the construction work, including the activities undertaken by workers on site, which is the responsibility of the contractor, not the architect.
- "Inspection" means a "close examination" (of construction); once again, this level of service is beyond the architect's responsibilities.

The architect's duty during field review is to carry out sufficient periodic site visits at appropriate intervals during the various stages of construction to determine if the work is in general conformity with the contract documents. In addition, the architect reports on the progress of the work and observations made on site.

Purpose of Field Review

The architect's field review work has the following three purposes:

- to monitor the contractor's performance in maintaining both the construction schedule and the standards or quality of construction;
- to provide guidance to the contractor by interpreting the contract documents and issuing necessary Supplemental Instructions;
- to fulfil performance standards of general review as required by the client-architect agreement, Authorities Having Jurisdiction, and provincial or territorial associations of architects.

Site visits must be more than a brief stop at the construction site to speak with contractors, walk around, and take a few notes to forward to the client. Site visits are essential to the project's success; the architect must, therefore, assign a qualified senior or experienced staff member who is properly trained to perform field reviews. It may be useful to prepare a manual with proper procedures for field personnel.

All field functions should follow these principles:

- carefully describe, to the client, the architect's duties and role during the construction phase and adhere to these responsibilities;
- keep the client well-informed of the progress of the work, in part by sending copies of field review reports to the client and all appropriate parties;
- ensure that consultants review their portion of the work and submit field review reports;
- avoid the words "*inspect*" or "*supervise*" in all documentation;
- keep proper documentation including reports, logs, photographs, and videotapes;

- promote good communications with the contractor and building officials.

Role of the Architect

The architect's role in a project changes from designer to contract administrator once the construction of a project is underway. Refer to to the Schedules of Architect's Services which accompany the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six*, for a list of the architect's responsibilities during the construction phase of a project. The architect is both a representative of the client and an interpreter of the contract documents. Normally, the architect is present on site to:

- conduct a general or field review;
- attend site meetings;
- interpret contract documents or resolve problems;
- observe testing or other procedures;
- review and accept samples, mock-ups, etc.;
- meet with consultants, contractors or the client regarding the progress of the construction;
- determine the percentage of the work completed (information which is used to prepare certificates).

In most agreements, the architect is not required to make exhaustive inspections or continuous on-site review; nor is the architect responsible for the construction methods or procedures or for construction safety. However, the architect should understand workplace safety and practise "due diligence" on the construction site.

Role of Others During Construction

The architect communicates with many others who may visit the site during the construction phase of a project, including:

- the client or designated representative;
- the consultants or design team;
- the contractor, sub-contractors, and suppliers;
- Authorities Having Jurisdiction;
- inspection and testing firms;
- other institutions, such as lending institutions and insurance agents.

Client
The client's role varies depending on the client's expertise and interest in the construction phase of a project. Some clients will assign a representative dedicated to this phase or hire a clerk of the works to monitor and account for construction activities. On the other hand, some clients rely exclusively on the architect as their representative. The client or designated representative usually attends regular job-site meetings.

Consultants
The field functions of consultants are critical to the success of a project. Typically, the architect is responsible for notifying and coordinating consultants as well as ensuring their attendance on site at the appropriate times. Consultants usually review the portion of the work which they have designed or for which they are responsible. They also determine, whether their portion of the work is in general conformity with the contract documents. In addition, consultants assist the architect in preparing certificates by attesting to how much of their portion of the work has been completed. Consultants may also be involved with other inspection and testing procedures.

Contractor
The role of the contractor is described in a construction contract, such as CCDC 2, and in the project specifications. Generally speaking, the contractor is responsible for the construction schedule, the quality of construction, and the construction methods and procedures. The contractor is also responsible for supervising the crew and coordinating sub-contractors. Typically, if a project is of a certain minimum value, most contractors will assign one individual to manage the project. This person — known as the site superintendent — is usually assigned to only one project at a time, frequently setting up an office temporarily in a construction trailer or part of a building which is under renovation. The contractor usually contacts the architect at varying stages of the project to schedule reviews.

Construction Safety

The constructor (usually the general contractor) is solely responsible for construction safety at the workplace and for:

- complying with the rules, regulations, and practices required by the applicable occupational health and safety legislation;

- initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the work.

Neither the owner nor the architect is responsible for safety at the construction site, unless the owner has awarded separate contracts or is using the owner's own forces for parts of the project. Some provinces have legislation which defines the owner as the *constructor* in these situations. The architect should review all applicable provincial and territorial occupational health and safety legislation to determine the architect's responsibilities in the workplace.

If an unsafe or life-threatening situation is observed, the architect is obliged to report immediately to the contractor, and to record the observation. Architects do not have a contractual obligation to report safety issues on a site; however, architects have a responsibility in tort – as does every individual – to do so. If an issue is noticed and not reported, an architect may assume responsibility for, or be liable for, contributory negligence for those unsafe practices observed. Nevertheless, when developing the scope of the architect's services in discussions with the client, avoid inadvertently assuming responsibility for site safety, especially when offering full-time, resident or expanded field services. The architect should make it clear to the owner and the contractor that the architect is **not** responsible for:

- the means, methods, sequence, procedures, techniques or scheduling of construction activities;
- job-site safety;
- electrical and mechanical services

Conducting a Field Review

Procedures

The architect should establish credibility on the job site from the start of the project. This is accomplished through a detailed knowledge and understanding of the project and the contract documents. The architect must conduct reviews systematically. Upon completion of a field review, the architect should prepare written reports for the owner and the contractor and, when required, for building officials. Site observations should be consistent, responding to the stage, progress, and quality of the work.

Some architects bring reduced-size sets of drawings to the site. These are very useful for comparing observed work with the contract documents. Other required or important tools to bring on site are:

- hard hat and safety boots;
- camera (preferably with a time and date record);
- voice recorder and/or note pad;
- safety glasses;
- safety vest;
- tape measure.

Depending on the project it may be useful to provide a variety of other tools.

Upon arrival at the site, the architect should either:

- talk to the site superintendent or leave a note for the superintendent; or
- contact the contractor's other site personnel.

A site visit can include:

- a quick overview, to get a general impression of the progress of the work relative to the schedule and to the last site visit;
- a tour with the contractor and/or owner to understand their problems and concerns;
- a tour with the general contractor and a single sub-contractor to concentrate on key trades in progress at the time.

The architect should not leave the site without speaking with the site superintendent or the contractor. Observations should be reported to the contractor's superintendent at the conclusion of the visit in order to indicate to the superintendent any problems which have been noted.

The architect should endeavour to promote good communication and a close working relationship at all times with the contractor. However, if it is not possible to resolve on-site problems, the architect should ensure that the deficiencies are recorded in a field review report. Refer to "Checklist: General Items for Field Review" at the end of this chapter and to the many published checklists for:

- items to review during site visits;
- construction administration services.

Frequency and Timing of Site Visits

The architect should schedule site visits at intervals appropriate to the construction. The frequency and timing is left to the judgement of the architect. Visits should be conducted at different times of the day and on different days of the week. This prevents familiarity with the architect's routine and the scheduling of some construction when it might not be readily observed. In addition, it may be necessary to make strategically timed site visits to deter the contractor from becoming complacent about any contractual obligations.

Before processing progress claim applications, the architect must also visit the site and make detailed observations to determine:

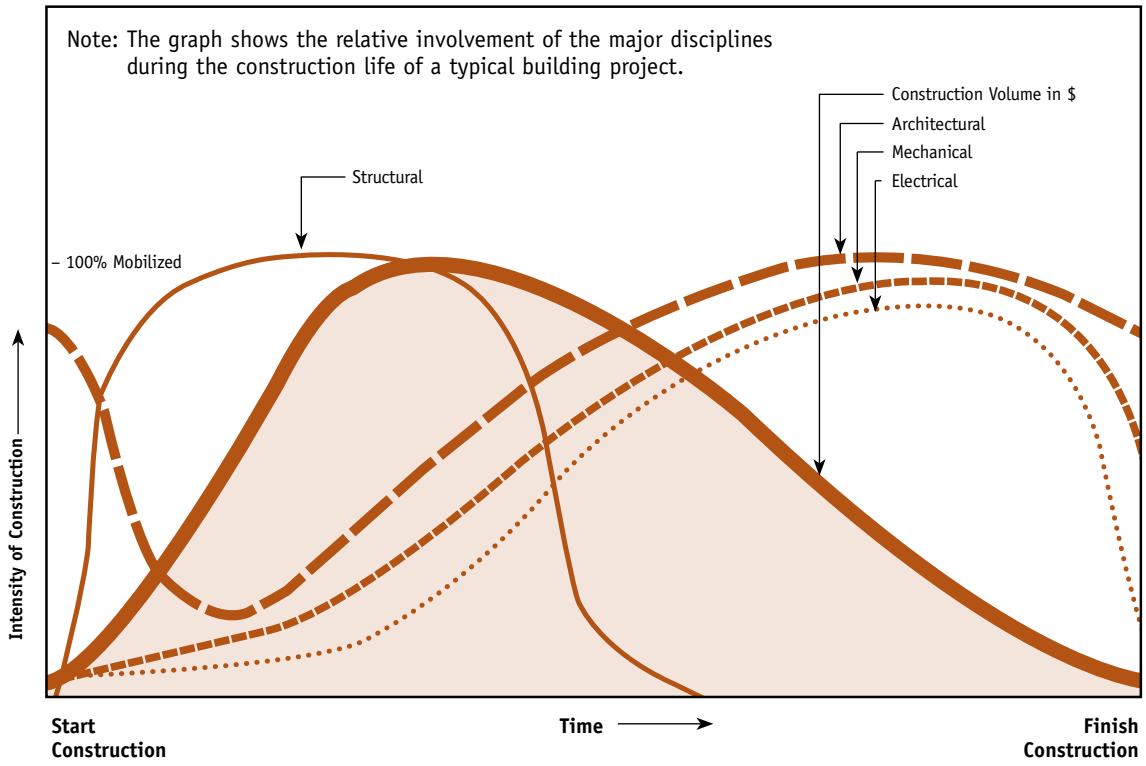
- the percentage of work completed;
- the amount of materials stored on site (or on the "extended site").

Usually, more visits are required at the start-up and close-out of construction as noted in Illustration 1. Structural engineering review is more intense at the early stages of a project, whereas mechanical and electrical consultants are more involved near the completion of construction.

The following are general guidelines on **when** to conduct field reviews:

- at project start-up and/or excavation;
- at the start of major sub-contractors' work on elements forming the enclosure of the building, such as:
  - forming and framing;
  - structural steel;
  - masonry;
  - waterproofing;
  - cladding;
  - window systems;

Illustration 1: Graph Showing Typical Duration and Intensity of Work on Site — By Discipline



  - roofing;
- at the start of finishing trades, such as:
  - floor finishes;
  - cabinetwork;
  - wall finishes;
  - painting;
- when significant new materials and equipment are delivered to the site.

Because many types of work (masonry, for instance) cannot be corrected readily without replacement, timely field review is needed to preclude rejection of work which has been underway for several weeks.

Additional field reviews should be considered immediately before and during concrete placement to review:

- key dimensions;
- placement of reinforcing steel and inserts;
- presence of any debris, rust, water, etc., within formwork;
- placement of electrical and mechanical services;
- concrete placement.

When the work of one trade is covered up by another trade, it is too late for observation; therefore, field reviews must be done before the following work is covered up:

- insulation;
- fireproofing/firestopping;
- vapour barriers;
- blocking and furring;
- electrical and mechanical services.

Scheduling reviews **before** work is covered up allows for deficiencies to be corrected prior to permitting the completion of the remainder of the installation.

The architect usually conducts a field review after any serious or unexpected change in the weather — which can have an adverse effect on work in progress — to determine whether any damage has been done to existing work, such as:

- undermining or weakening of footings or foundations by heavy rain;
- freezing of concrete or mortar due to sudden drops in temperature;
- frost penetration of sub-soil;
- damage to roofing membranes and unbraced walls by strong winds;
- improper curing or drying out of materials from prolonged heat.

Finally, the architect may:

- carry out a detailed review before the owner takes early occupancy of any area, prior to completion of the entire project;
- prepare a deficiency list for the contractor and the owner before partial occupancy takes place.

Field Locations

The architect may be required to make and record observations in three possible locations:

- the construction site;
- the "extended" site;
- the plant or location of off-site fabrication.

The Construction Site

The construction site — the location identified in the contract documents where the building is situated — is called "Place of the Work" in CCDC documents. This is where most of the construction activities take place and where the architect will conduct most of the field reviews, unless the building is prefabricated off-site.

Extended Site

An extended site refers to a location where products may be stored away from the construction site. The value of major items delivered to an off-site location may be considered eligible for payment, subject to the terms of the contract or once the following conditions have been met:

- after authorization or approval (usually for products which are costly or custom-made);
- after the contractor has made provision for:
  - secure storage (for example, a bonded warehouse);
  - insurance;
  - bonding;
- after the architect has made visits to observe the items at their storage location.

Plant or Off-site Locations

Review of work which is fabricated or assembled in a plant may also be necessary. The architect or consultants observe work in the plant to:

- examine the manufacturing facilities and capabilities of the sub-contractors before

a contract is awarded;
- check or confirm progress of items, such as:
  - items whose schedule for delivery is critical to the progress of the project;
  - items which come to the construction site pre-assembled and could not be properly reviewed after delivery;
- resolve problems noted by inspection and testing companies, such as:
  - truss welding details;
  - prefabricated wall panel details;
- resolve manufacturing problems concerning details which prove to be impractical, such as:
  - the size of metal breaks;
  - prefabricated wall panels;
- witness tests undertaken in the plant, such as:
  - tests for curtain wall mock-ups;
  - tests on specialized prefabricated roof structures;
  - tests of air diffusers;
- review mock-ups, such as:
  - elevator cabs;
  - special ceiling systems;
- determine the source of problems occurring in the field which can be traced to plant manufacture or fabrication, such as:
  - welding deficiencies;
  - efflorescence.

Reporting

The architect should write a report after every visit spent observing work in the field. The field review report may include the following information:

- name and position of the person conducting the field review;
- date, time, and duration of the visit;
- weather conditions, including any extreme conditions;
- names of those present or name of the site superintendent and the general contractor;
- percentage of work completed by trade;
- work progress compared to the contractor's schedule;
- work now underway or being accomplished;
- work scheduled to be completed before next visit;
- questions raised by the contractor or the owner;
- determinations made by the architect;
- outstanding issues requiring action;
- the list of people receiving copies of the report;
- status of deficiencies or outstanding issues from previous report;
- the report number for filing purposes.

Refer also to Chapter 2.4, *Sample Forms for the Management of the Project*, for a sample form for a field review report.

The architect should refer to one of the several available checklists for the review of building construction. Many checklists are organized by trade in the MasterFormat™ system. Architects can take the checklist to the job site and use it to assist in recording observations and writing field review reports.

Refer also to the RAIC Field Review / General Review Distance Learning Course, *Guidelines for Conducting and Documenting Construction Site Visits*, which includes 16 checklists.

Mock-ups

Mock-ups are usually full-scale, partial constructions of a certain system or building component. The contractor or sub-trade prepares a mock-up, when specified, to:

- demonstrate a full understanding of the drawings and specifications;
- uncover any problems;
- represent the quality of construction expected by the architect.

The architect should establish a schedule for construction of mock-ups and procedures for their review of at a pre-construction meeting.

Site Meetings

Pre-construction Meeting

The tone, format, and efficiency of all subsequent meetings is often set at the pre-construction meeting. The architect should be well prepared for this first meeting.

Before work commences on the site, the architect usually makes a detailed review of the site with the contractor, and documents the condition of the existing site (existing structures, sidewalks, etc.) in order to:

- establish the state of existing facilities

before work starts;
- provide a basis for settling any disputes arising from damages which may occur during construction.

Refer to "Checklist: Suggested Agenda for the Pre-construction Meeting," located at the end of the chapter, for issues to be discussed and resolved at this important first meeting.

Regular Site Meetings

One of the architect's responsibilities during construction is to participate in job-site meetings. The architect should be familiar with the progress of the job prior to any regularly scheduled job meeting. Regularly scheduled site meetings are essential to:

- communicate the client's expectations to the construction team;
- ensure good communication between all parties;
- exchange and transmit technical information such as shop drawings;
- provide a structured opportunity for field review;
- resolve problems and discuss all relevant design and construction issues;
- assist in making judgements and determinations;
- review schedules and progress claims.

Site meetings provide an excellent opportunity for the architect to establish an on-site presence. Minutes of the site meetings should always be recorded. They should indicate what actions are required and who is responsible for the action. Minutes should be distributed within 48 hours of the meeting. Either the architect or the general contractor prepares the minutes, depending on the architect's choice and the general requirements of the specifications.

Field Review Services of Consultants

The architect is usually the prime or "managing and coordinating" consultant, and is responsible for coordinating the field functions of the engineering and other consultants. It is important to call upon the services of the consultants at the appropriate stage of construction. All consultants should be required to submit field review reports in a format similar to that used by the architect, and the architect will distribute the reports as required. In addition, the architect relies on the consultants to determine the value or percentage of work completed by each respective discipline in order to prepare Certificates for Payment.

Engineers and other Consultants

The field review by engineers is critical to a successful building. The architect will normally:

- be familiar with the engineering work;
- note significant issues during site visits;
- bring those issues to the attention of the respective disciplines.

The role of consultants in the contract administration phase of the project follows the role of the architect. The engineers and other consultants should:

- review and provide the field functions as required at times appropriate to the stage of construction;
- provide written field review reports each time they visit the site.

Some aspects of review by engineering consultants differ from that of the architect. For example, some engineering disciplines — especially mechanical and electrical — provide information in a more diagrammatic manner than is presented in typical architectural drawings. Therefore, the trade or sub-contractor can use more discretion in the installation and operation of various equipment and systems. This diagrammatic information requires more interpretation on the part of both the engineer and the sub-contractor.

Testing Agencies and Inspection Services

Independent inspection provided by specialist inspection and testing firms is required on most construction projects. The following summarizes the relationship of these specialists with the architect:

- inspection and testing is usually recommended by the architect or the engineers;
- these specialists do not supersede the architect's authority;
- these services are ancillary to the architect's basic construction administration services;

- the architect must ensure that he/she is only assisting in the process and does not assume a contractual obligation;
- inspection and testing firms undertake tests and issue timely reports, but they do not interpret the results of these tests or issue instructions to the contractor;
- interpretations are made by the contractor in the first instance and finally by the architect and the engineering consultants.

Inspection and testing firms are frequently selected by methods typically used for selecting other professionals, that is, by soliciting proposals. The cost of these services is generally paid for by the owner who contracts:

- directly with the inspection agency; or
- indirectly through the general contractor.

Inspection and testing services are frequently paid through cash allowances provided for in the construction contract. Sometimes, inspection and testing services are included as a sub-contract. For example, air balancing is frequently a sub-contract of the mechanical contractor. Also, manufacturers' representatives — such as certain roofing membrane manufacturers — commonly inspect the installation of their products by the trades to ensure compliance with their standards.

The following are typical examples of inspection and testing required:

Division 03 — Concrete
- test for air entrainment
- slump test
- load testing on cylinders
- core drilling and testing
- inspection of placement of steel reinforcement
- X-ray of existing concrete slabs

Division 04 — Masonry
- mortar test and chemical composition
- testing of masonry units for compressive strength, absorption, etc.

Division 05 — Metals
- inspection of welds, fabrications, etc.
- field inspection
- inspection of load-bearing metal stud framing

Division 06 — Wood, Plastics and Composites
- special lumber grading

Division 07 — Thermal and Moisture Protection
- building envelope
- inspection of fireproofing and firestopping
- roofing inspections (installation and cut tests)

Division 09 — Finishes
- flooring and painting inspections

Division 14 — Conveying Equipment
- elevator testing and certification

Division 21 — Fire Suppression
- testing and certification of sprinkler systems

Division 23 — Heating, Ventilation and Air Conditioning
- air balancing

Division 25 — Integrated Automation
- testing of controls

Division 26 — Electrical
- testing of emergency lighting and emergency power supply

Division 27 — Communications
- testing of communications systems

Division 28 — Electronic Safety and Security
- verification of fire alarm system

Division 31— Earthwork
- additional geotechnical reports
- soil-bearing capacity
- approval of backfilling materials
- compaction of soils or fill
- load tests on, and inspections of, piles and caissons
- inspection of underpinning and shoring
- inspection of soil stabilization

Testing of complete systems, such as the building envelope, interior air quality, or integrated electrical and communications systems, may also be required.

Continuous On-site Representation

For certain large and complex projects, or some fast-track projects, continuous on-site representation is required. If provided by the architect, it is considered an additional service requiring negotiation of a fee over and above the basic fee. Alternatively, the client may choose to directly hire a clerk of the works. Usually, the responsibilities of a clerk of the works are limited and do not include contract document interpretation. The clerk of the works records construction activities and quantities, often for unit price contracts.

A continuous, on-site architectural representative may undertake some of the following duties:

- coordinating all communications;
- interpreting contract documents;
- assisting in the preparation of Change Orders and certificates;
- arranging for inspection and testing;
- preparing record drawings;
- attending site meetings;
- providing continuous field review and maintaining a daily log which contains:
  - weather conditions;
  - major material and equipment deliveries;
  - daily construction activities, percentage of completion of work, and work force;
  - records of work stoppages and reasons for them;
  - occurrence of inspection and testing and their results;
  - special visitors;
  - unusual conditions or significant developments on site.

The architect's role as a continuous, on-site representative should be carefully and clearly defined, and an appropriate fee negotiated with the client.

Definition

General Review: Visits to the place of work at intervals appropriate to the stage of the construction that the architect considers necessary to become familiar with the progress and quality of the work and to determine that the work is in general conformity with the contract documents.

References

Mahoney, William D. Editor. *Construction Inspection Manual*. Los Angeles, CA: Building News Inc., 1998.

Stitt, Fred A. *Construction Administration and Inspection Checklist: A Complete Guide For Exterior And Interior Projects*. New York, NY., Van Nostrand Reinhold Company.

The Royal Architectural Institute of Canada
Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six.

Field Review / General Review Distance Learning Course, *Guidelines for Conducting and Documenting Construction Site Visits,* 2003.

Appendix A — Tips for Site Observations – General

The architect undertaking field review should refer to one of the many published checklists for assistance in conducting site visits. The following is a partial list of very general matters to review on construction sites. Refer also to Appendix B – Professional Standards for Field Review / General Review.

Architectural Items

A1 **Aesthetics** includes the location and appearance of exposed mechanical and electrical components, particularly in areas exposed to view which should be finalized during roughing-in.

A2 **Cleaning** of trapped areas must be undertaken continually. The architect reviews and checks that accumulated dirt and dust is not allowed to build up and be covered up by the work of later trades. This includes dirt and food products left inside chase walls, above ceiling areas, and in interstitial spaces which could eventually find its way into areas occupied by the public. This also includes cleaning of areas such as cavity wall spaces which could affect the performance of weep holes.

A3 **Code Requirements** include stairs, exiting, life support systems, and anything which involves public health and life safety.

A4 **Datums and Tolerances** involve points used to determine floor levels with respect to outside grades or adjacent structures. Also required to maintain setbacks from other buildings or property lines and plumbness of vertical elements such as elevator shafts.

A5 **Deflections** require that appropriate allowances be made during and after construction for the deflections that will occur in beams, floors, and slabs as they are loaded. Beams and lintels above masonry and deflection of steel decking under roof parapets are typical examples.

A6 **Drainage** includes the provision of adequate slopes to drain water in floor slabs, pits and vaults, paving areas, and below slab weeping tiles. Inadequate slopes and drainage are a major cause of claims and litigation.

A7 **Expansion and Control Joints** must align with related joints in the building structure and at areas of expected movement. Joints should be consistent in all planes of the building envelope and interior, must not be constrained by construction, and must be allowed to expand and contract freely. The damage to the building fabric and visual impact of improperly designed joints are among the most significant problems with construction.

A8 **Fireproofing** of building structures requires checking the thickness and densities of materials. There must be sufficient room to apply spray on fireproofing, and it must not interfere with mechanical and electrical systems. Patching of damaged fireproofing must be undertaken so as to not impair the tested ratings of the system, and testing and inspection should be done by recognized testing companies.

A9 **Fire Protection** must maintain the required fire separations mandated by building codes. Provision must be made where fire separations are penetrated by other building systems such as mechanical and electrical systems as well as vertical services such as elevators and stairs. The materials used must meet current standards. Confirm that the materials have the required fire ratings, that they are installed by approved methods and in all required locations.

A10 **Hardware** on building projects is subject to substitutions and changes of hardware, changes of use or occupancy, and requested changes from Authorities Having Jurisdiction. The architect requests the hardware supplier to check and accept the methods of installation and confirm that the requirements of the occupants and Authorities Having Jurisdiction are met.

A11 **Humidity and Water Infiltration** trapped in wall and roof systems during the construction phase can lead to problems with rot and damage. The architect checks for excessive moisture in insulation materials, windows, and roofing systems. Excess humidity during the installation of many building materials will also lead to long-term problems. Gypsum board or acoustic ceiling panels will swell or sag when subjected to moisture levels exceeding permitted levels.

A12 **Mechanical and Electrical Equipment** such as elevators, escalators, fans, pumps, and operable doors, etc., require break-in periods. To avoid excessive breakdowns and callbacks by the contractor, these break-in periods should be done before the owner accepts the building. Access panels and other items require coordination with architectural finishes.

A13 **Operating space** is required to allow maintenance operations to be undertaken when the building is turned over to the owner. This includes space to allow staff easy access to filters, fans, valves, air handling equipment, and life safety items. The architect checks that equipment is installed so that maintenance and replacement is simplified and also so that space is available to move equipment in and out. This includes doors, access panels, and corridors.

A14 **Public Safety** requires that proper hoarding, overhead protection and scaffolding, and barriers be provided. The architect should be aware that the contractor is responsible for controlling the site and its safety. If the architect sees a potential problem, the architect should report this immediately to the project site superintendent; however, the architect does **not** make any recommendations as to how the safety problems should be solved.

A15 **Wall and Floor Thicknesses** should be confirmed on site to ensure that they are sufficient to conceal the services which are to be installed inside them. Typical services include ductwork, plumbing and waste stacks, washroom equipment, etc. The architect makes observations to ensure that any required fire resistance ratings are maintained where services are installed in walls or in furred-out walls. Services which are installed in concrete floors should also be reviewed so that sufficient cover remains to ensure that the fire rating is maintained or the structural requirements are not impaired.

A16 **Water** in new construction poses particular problems because systems installed on wet or damp substrates can have long-term problems. When materials such as bituminous membranes are installed on wet concrete or damp masonry, the adhesion may fail. The contractor should be made aware of the importance of protecting all sensitive materials and the strict adherence to manufacturers' requirements for moisture content.

Appendix B - Professional Standards for Field Review / General Review

Introduction

Terminology

The terms "Field Review" and "General Review" are used interchangeably in various parts of Canada; they have the same meaning and force in law and form an essential component of the architect's services during the construction phase of a project. For convenience, this service will be referred to in this document as **field review**.

Purpose

The purpose of this Appendix is to summarize:

- the professional standards which the architect must maintain when performing field review services;
- the scope of professional services required during field review;
- the determination of the appropriate fee related to the agreed field review services;
- recommended reporting formats.

Professional Standards

Successful contract administration means that the architect must effectively integrate the administration of the services provided in the office with field reviews carried out on the site. Regardless of which project delivery method is used, all architects must always follow best practices during field review because these services form a significant part of architectural services to the client.

The frequency, number and extent of field reviews required on a specific project is the prerogative and professional responsibility of the architect who should resist any attempt by the client to dictate the number of visits or to limit the amount of fee for field review services. Substantial settlements (payments resulting from a claim) have resulted when architects have limited their field review visits under pressure from their clients. The Courts have made it clear that there is an expectation for the architect to conduct a field review process that meets recognized professional standards, regardless of the fee or, in the alternative, to withdraw from the project.

The architect's aim should be to keep ahead of events on the site and to assist the construction process in running smoothly (which is clearly to the advantage of the owner, the architect and the contractor), in order to achieve the desired end result without undesirable compromises. The architect must identify to the contractor all specific events about which advanced notification is required, particularly in relation to the scheduling of the portions of the work which will require:

- pre-construction meetings;
- special inspections or testing.

The architect must also monitor the work of consultants.

Scope of Field Review Services

Services identified as "*supervision*" or "*inspection*" are not normally provided by an architect.

Field review, as defined in the client/architect contract, is intermittent, neither constant nor comprehensive:

- field review is based on a systematic, random sampling of the work;
- the architect is entitled to rely on the contractor's consistency for the quality of the work.

The contractor, under contract with the client, has contracted to construct a building which is in general conformance with the contract documents. The ability of the architect to enforce this intent varies and depends on the type of project delivery method used:

- the greatest level of control is under a stipulated price contract (such as CCDC 2);
- the least control will likely occur when the client is an owner-builder, whose objectives may be restricted to quick completion at the lowest possible cost;
- the various forms of construction management and design-build contracts fall between these extremes.

The two broad categories of field review services are:

- **Matters required by the Building Code:**
  These services are a regulatory requirement and they must be performed. The usual practice is for these services to be provided by the project's architect, but others who are qualified to do so may be engaged by the client.

- **Contractual Matters or "good practice":**
  These are matters related to workmanship, appearance, accuracy, etc. and they go beyond the review required for code-related matters. These services should be set out in a schedule of the scope of services in the client/architect contract (**Canadian Standard Form of Contract for Architectural Services –Document Six 2002**).

Essential elements of field review for building code matters include:

- site visits;
- written reports;
- changes to the work;
- shop drawings;
- coordination of consultants.

Elements of field review for "good practice" matters are similar, except that:

- the architect will identify, as a matter of professional judgement, which shop drawings for non-Code items will require review by the architect;
- these elements should be predetermined and set out in the contracts - between the client and contractor, and between the client and architect (such as in the *Schedule of Architect's Services* in Document Six).

Fees for Professional Services for Field Review

The following are procedures to determine the fee for field review services:

1. If engaged for field review, confirm whether the services will include non-Code matters (Building Code matters should always be part of the fee);
2. Establish a draft of appropriate services for the specific project;
3. Define the scope of services which address these;
4. Discuss the field review process and appropriate fee with the client;
5. Make adjustments as required;
6. Review with consultants.

Be aware of obligations required by the Building Code and by the relevant provincial Architects Act, such as preparing and submitting field review reports to the municipality having jurisdiction over the project. Remember that if contracted to certify payments to the contractor, the architect is then required to provide field review for both Building Code and non-Code matters. Field review, as well as payment and substantial performance certification, are included in the definition of contract administration in the standard client/architect contract.

If the municipality requires shop drawings of Code-related matters to be submitted for their records, advise the client that the cost of making these submissions is included in the fee for contract administration.

Evaluate the time required to provide field review services appropriate to the specific project, calculate the fee, and review it in detail with the client prior to signing the client/architect contract. The client/architect contract should record:

- the agreed-to scope of services;
- the related fees, and
- an amending provision to adjust the contract should circumstances differ from what was agreed.

Circumstances which were not anticipated originally may require renegotiation.

Many factors affect the ability of the architect to prescribe fully, at the time of preparing the client/architect contract, the number, frequency and extent of site visits, however, some of the following factors can be predicted with some degree of accuracy and should be considered in establishing the fee:

- size and complexity of project;
- type of construction contract and method of project delivery;
- experience of the client with construction matters;
- requirements for submission of Code-related shop drawings to the municipality having jurisdiction over the project.

These are known prior to the execution of the client/architect contract and should be identified in the contract and the related costs included in the fee.

Other factors cannot be predicted accurately, such as:

- varying weather conditions;
- quality of workmanship of trades;
- performance of general contractor and its personnel assigned to project;

Review the provisions made in the contract to allow for these uncertainties with the client and advise the client that the scope and fee may need to be re-visited if changes in the scope of services occur due to circumstances unforeseen at the time of execution of the contract.

Procedures

1. Review and bring to the attention of the chief building official all changes that may affect Code compliance, including shop drawings for Code related matters that are at variance with the permit documents;
2. Review and comment on shop drawings and samples for Code compliance to determine general conformity with the design concept (the architect may also review shop drawings for non-Code matters);

It is prudent to consider the impact on Building Code requirements of each Proposed Change and to obtain approval from the chief building official before finalizing Change Orders.

The architect is usually engaged to coordinate field review activities of other consultants (whether or not engaged by the architect) which include, for their respective disciplines:

- site reviews;
- written reports;
- review and comment on the costs quoted for changes to the work;
- shop drawings and samples;

Refer also to “Checklist: Coordinating Consultants” (Chapter 1.2.3 - Consultants).

In some instances, the architect may be working under a prime consultant (another architect or a professional from another discipline) whose responsibilities will include coordination services for the project; in these circumstances the Code requires the architect to cooperate with the prime consultant providing coordination of other consultants.

Conclusion

In the final analysis, whether or not the architect has exercised appropriate professional judgement in attending at the site, including when or how often these attendances should have occurred, will be determined by a panel of the architect's peers, in the case of complaints and discipline hearings, or by a judge or arbitrator, in a matter of a claim against the architect.

Definition

General Review/Field Review means review during visits to the *Place of the Work* (and where applicable, at locations where building components are fabricated for use at the *Project* site) at intervals appropriate to the stage of the construction that the *Architect*, in his or her professional discretion, considers necessary to become familiar with the progress and quality of the *Work* and to determine that the *Work* is in general conformity with the construction documents.

(*Canadian Standard Form of Contract for Architectural Services –Document Six 2002–* Definitions)

References

RAIC Professional Development Course, Distance Learning Kit, *Field Review/General Review* with CD-ROM which includes:

- *Guidelines for Conducting and Documenting Construction Site Visits*
- *Checklists*

OAA Practice Bulletins: A.10 series

Checklist: Suggested Agenda for the Pre-construction Meeting

1. **Introduction**
   - all attendees and who they represent.

2. **Administrative Procedures**
   - schedule of meetings;
   - who will record and distribute minutes;
   - format of minutes;
   - general communications;
   - procedures for distribution and routing and for the review and/or approval of information, including:
     - correspondence;
     - shop drawings, including format, turn-around time, etc.;
     - samples, including mock-ups and schedule;
     - substitutions;
     - tests and inspections, including identifying companies and reporting circulation;
     - progress payments;
     - Change Orders, including procedure and forms.

3. **Project Team Directory**
   (as per Form 1.5 of Chapter 2.4, *Sample Forms for the Management of the Project*)

4. **Current Project Status**
   - receipt of:
     - building permit;
     - insurance and bonds;
     - certificates of good standing from Workers Compensation Board;
   - identification of Authorities Having Jurisdiction;
   - permits for gas, electrical services, other utilities, etc.

5. **Job Site Documents**
   - permit set;
   - codes and standards;
   - geotechnical report.

6. **Review of Information from Contractor,** including:
   - construction schedule;
   - schedule of values for progress draws;
   - cash flow projections.

7. **Site Issues**
   - parking;
   - loading and storage;
   - garbage, construction waste, and recycling requirements;
   - hoarding and fencing;
   - tree protection;
   - project identification and signage;
   - snow removal;
   - operational constraints (use of existing washrooms, maintenance of existing services, etc.);
   - hazardous materials (handling and disposal).

8. **Construction Services and Utilities,** including:
   - water;
   - heat;
   - light;
   - power;
   - toilets;
   - construction office;
   - communications systems.

9. **Requirements for Pre-construction Surveys**
   - recording existing conditions;
   - setting out of foundations, establishing property boundaries.

Checklist: General Items for Field Review

1. **Permits and Inspections**
   - determine whether the contractor has arranged for all permits and inspections required for compliance with local, provincial, and federal regulations, including:
     - building permits;
     - environmental permits, if applicable;
     - safety and labour department permits.

2. **Code Requirements**
   - observe whether construction is proceeding in accordance with the requirements of applicable codes:
     - the contractor is responsible for compliance with all regulations for construction methods;
     - the architect is responsible for design.

3. **Shop Drawings and Samples**
   - confirm that the contractor has reviewed copies of all applicable shop drawings on site and they are being used for construction;
   - confirm that approved samples are kept on site for reference and comparison with the completed work.

4. **Mock-ups**
   - before the work commences, have the contractor prepare on-site mock-ups and retain them for reference for:
     - the work of certain trades;
     - significant repetitive elements;
   - mock-ups allow tradespeople to see what impact and interface is required between trades before work begins on, for example:
     - masonry walls;
     - through-wall flashings;
     - window installations;
     - roofing and flashings.

5. **Materials and Equipment**
   - review materials and equipment immediately after delivery to the site for conformance to the contract documents by the architect or the consultant;
   - advise the contractor to store materials so that they can be readily observed.

6. **Fabrication**
   - a visit to the plant for certain critical work and items with a long lead time may be warranted.

7. **Workmanship**
   - remind the contractor of the required quality of workmanship:
     - from the start of the project;
     - through the contractor so that all trades are aware of the standards;
   - make frequent spot checks so that the standards established initially are maintained.

8. **Handling and Storage**
   - note the methods of delivery, handling, and storage of materials and equipment;
   - observe whether these meet applicable standards and no damage to the project or materials will result.

9. **Protection**
   - observe:
     - insulation exposed to sunlight;
     - masonry exposed to rain or snow or wind;
     - millwork and carpentry exposed to the elements;
     - structure overloaded by pallets of materials concentrated close together.

10. Erection and Installation

- the contractor is solely responsible for construction methods:
  - the architect risks incurring liability by offering suggestions;
- during the installation and erection of work, the architect checks the procedures being used by reviewing:
  - specifications;
  - notations on shop drawings;
  - agreed-to instructions and correspondence;
- the architect reports any concerns about erection procedures for structural work to the structural engineer immediately.

11. Relation to Prior Work

- review the work of trades already completed;
- establish with the contractor whether corrective work is necessary before the work of the next trade contractor begins;
- request the contractor to obtain acceptance of the previous work by the next trade contractor, for example, acceptance of:
  - steel decking before installation of roofing;
  - concrete floors before installation of finish flooring;
  - gypsum board substrates before painting.

12. Cooperation Between Trades

- review with the contractor the need for coordinating the work between trades;
- observe whether the trades are cooperating and that one is not disregarding the requirements of another;
- make proper interference drawings available, especially drawings for the mechanical and electrical trades showing:
  - ductwork;
  - sprinklers;
  - lighting fixture layouts.

13. Clean-up and Safety

- check that the site is being maintained in a clean and safe condition;
- an untidy site indicates potential problems:
  - fire hazards;
  - accidents;
  - lowered productivity;
  - Authorities Having Jurisdiction may close the work down if serious problems are not rectified;
  - the owner may develop a negative image of both the contractor and the architect, even though the architect has no control over how the work is being performed;
- if unsafe working conditions or practices are evident, notify the contractor's superintendent immediately and record the notification and circumstances;
- if action is not forthcoming, report immediately to the proper authorities.

14. Inspection and Testing

- establish that arrangements with the inspection and testing companies have been made and verify that:
  - representatives of those companies are or have been on site when required;
  - necessary test or control procedures are being made;
  - detailed reports are being prepared and issued.

(Refer to "Testing Agencies and Inspection Services" earlier in this chapter.)

15. Contract Document Review

- check the work against:
  - original contract documents;
  - addenda;
  - Change Orders;
  - Supplemental Instructions.

16. As-Built Drawings

- remind the contractor to update the drawings regularly as the work progresses.

17. Site Visits with the Owner

- make visits with the owner as the work of various trades is completed;
- make a site visit or series of visits with the owner's representative before the work is accepted.

Checklist: Final Field Review

Review Items	Observations	NBC Reference
STRUCTURE	❑ complete	
	❑ window cleaning anchorage systems	
	❑ final review conducted by P. Eng	
HVAC	❑ complete & operational	
	❑ fire dampers at all fire separations	3.1.8.7.-3.1.8.9.
	❑ venting of commercial cooking equipment	6.2.2.6.
	❑ smoke control verification in high buildings	3.2.6.10.
	❑ final review conducted by P. Eng	
PLUMBING	❑ complete, tested & operational	
	❑ backflow prevention devices installed & tested	7.1.2.1.
	❑ final review conducted by P. Eng	
ELECTRICAL	❑ supply, lighting & heating complete & operational	
	❑ emergency lighting	3.2.7.3.
	❑ emergency power	3.2.7.4.
	❑ final review conducted by P. Eng	
BUILDING ENVELOPE	❑ environmental separation	5.1.4.2.
	❑ thermal resistance	5.3.1.1.
	❑ precipitation protection	5.6.1.1.
	❑ grading for surface water	5.7.1.1.
FIRE ROUTES	❑ open & accessible	3.2.5.5.-3.2.5.6.
	❑ minimum 6m width	
	❑ capable of supporting response vehicles	
FIRE ALARM & SUPPRESSION	❑ fire alarm system tested & verification report	3.2.4.
	❑ firefighting water supply & hydrant location	3.2.5.7.
	❑ standpipe system, fire hose cabinets & extinguishers	3.2.5.8.-3.2.5.12.
	❑ sprinkler/extinguishing system tested & operational	3.2.5.13.
	❑ fire department siamese pumper connections	3.2.5.16.
	❑ firefighters' elevator	3.2.6.1., 3.2.6.5.
GUARDS	❑ balconies	3.4.6.5.
	❑ stairs & landings & where drop exceeds 600mm	
	❑ windows & transparent doors	3.3.1.18.
	❑ height, openings & climbability	3.4.6.5.
	❑ load capacity	4.1.10.1.
	❑ retaining walls	

✕ NOT APPLICABLE ✓ IN COMPLIANCE ● NOT IN COMPLIANCE ❋ SEE COMMENTS

Review Items	Observations	NBC Reference
FIRE SEPARATIONS & FIRE RESISTANCE	❑ firewall integrity	3.1.10.
	❑ conformance of specified assemblies	
	❑ verification of spray fireproofing	
	❑ exits	3.4.4.1.
	❑ floors	
	❑ mezzanines & interconnected floor spaces	3.2.8.1., 3.2.8.2.
	❑ loadbearing columns supporting rated assemblies	3.1.7.5.
	❑ roofs	
	❑ spatial separation for exterior walls	3.2.3.
	❑ public corridors	3.3.1.4.
	❑ between occupancies	3.1.3.1.
	❑ between suites	3.3.1.1.
	❑ garbage, mechanical service, janitor rooms	3.6.2.
	❑ shafts	3.6.3.
	❑ labeled door, frame & other closures	3.1.8.
	❑ firestopping	3.1.9.1., 3.1.11.
	❑ combustible piping penetrations	3.1.9.4.
	❑ hazardous substances – Fire Code compliance	3.3.1.2.
EXITS	❑ separation integrity	3.4.4.4.
	❑ door swing direction	3.3.1.10., 3.4.6.11.
	❑ door hardware, latching, & self closing devices	3.1.8.11., 3.1.8.13.
	❑ panic hardware, hold open & electromagnetic release	3.4.6.15.
	❑ handrails, continuous one side	3.4.6.4.
	❑ uniform rise & run	3.4.6.7.
	❑ exit signs	3.4.5.
	❑ lighting	3.2.7.1.
	❑ unobstructed safe egress at grade	
BARRIER-FREE ACCESS	❑ exterior walk & ramp to parking	3.8.3.2., 3.8.3.4.
	❑ entrance threshold	3.8.3.3.
	❑ door operator	3.8.3.3.
	❑ washroom clearances & fixturing	3.8.3.8.-3.8.3.12.
	❑ handrail extensions	3.4.6.4.
	❑ signage for parking, entrance, washrooms	3.8.3.1.
	❑ corridor obstructions affecting visually impaired	3.3.1.9.(3)
UNFINISHED BUILDING OCCUPANCY	❑ compliance within occupied areas	
	❑ housekeeping	
	❑ authority to occupy permit obtained	
AS-BUILT CONFORMITY	❑ consistency with approved documents	2.6.2.1.
	❑ authorization for changes obtained	
COMMENTS		

✕ NOT APPLICABLE ✓ IN COMPLIANCE ● NOT IN COMPLIANCE ❊ SEE COMMENTS

Checklist: Architect's Role in Soils and Materials Testing

Notes
Soils and materials testing agencies are generally arranged by the architect on behalf of the client. Their fees are paid by the client, either directly, or indirectly through allowances included in the contract price. *For convenience, these are referred to as 'agencies' in this document.*

Manufacturers' representatives commonly inspect the installation of their products to ensure compliance with their standards and there is no additional cost to the client for these services. The architect is normally responsible for the coordination of these agencies. The basic services and principles for coordination should be affirmed/clarified by the architect as early as possible.

Comments, clarifications or recommendations are in *italics*
Use of a forward slash (/) signifies *and* or *or*

Refer also to "Checklist for the Management of the Architectural Project" in Chapter 2.3.1 *Management of the Project,* Chapter 2.3.4 *Pre-design* and Chapter 2.3.11 *Contract Administration - Field Functions*

Pre-agreement

1. Defining expectations:

❑ Before beginning negotiations with potential agencies prepare clear definition of expected performance for each specialty, including:

a) extent of participation by agency during design/documentation stages: *(this is more relevant to some specialties than others such as design consultation from a roofing inspector)*

b) knowledge of/commitment to current practice in specialities such as sustainable design or embodied energy

c) contract administration procedures:
  i) site attendance:
    - on demand:
      - expected notification
      - normal/emergency response time
    - regularly scheduled *for work continuing over extended time period*
    - off-site locations *fabricating/ manufacturing plants*
  ii) reporting, including :
    - frequency of reports *(some agencies may accumulate reports and submit them monthly, unless instructed otherwise)*
    - measuring quantities *additional excavation/backfilling*
    - procedures when emergencies occur
  iii) site instructions, including policy for prior authorization/approval
  iv) review of change quotations *as requested*

❑ review past performance of previously engaged agencies. Review unsolicited offers of service from agencies not previously engaged

❑ Seek confidential recommendations on unfamiliar agencies from colleagues/clients *(Some clients may have ongoing service contracts with specific agencies and will instruct architect accordingly. Concern for due diligence may indicate that seeking independent recommendations on the client's selected agency is advisable. In this case, the client's approval should be obtained in advance, and all information obtained reported*

to the client. Confidentiality of comments received must be respected, therefore the architect is obliged to obtain original source's permission to report his comments, or maintain confidentiality of source, if so requested)

- ❑ Prepare short list of agencies selected *(formerly engaged/new)* to interview
- ❑ Develop score sheet for use during first interviews for consistent recording/rating of agencies' responses

2. Interviews

(separate preliminary discussions with each of selected agencies to confirm that agency understands/accepts architect's performance expectations)

- ❑ Encourage agency to describe their procedures in dealing with architects
- ❑ Confirm adequate professional liability insurance
- ❑ Make notes on score sheet

3. Following Interviews

- ❑ Review score sheets for each agency
- ❑ Eliminate unsuitable agencies
- ❑ Prepare formal Request for Proposals (RFP) letter for selected list of agencies
- ❑ Different letters will be required for each specialty, but each should include:

a) statement of expectations, confirming topics presented during interview *(specific performance requirements should be stated in detail in initial RFP letter)*

b) description of project, giving as much information as possible:
- project name/client/location
- site
- target date for completion

c) proposed schedule *as relevant to required testing/inspection:*
- pre-design/documentation
- construction

d) fee basis:
- lump sum
- percentage
- unit rates

e) request to confirm/provide:
- acceptance of performance expectations
- ability to meet timetable
- proof of professional liability insurance

4. Appointment of Agencies

- ❑ Review proposals and verify acceptance of performance expectations/adequate professional liability insurance
- ❑ Analyse any additional conditions *agree or reject*
- ❑ Select best proposal for each specialty *(may not be the cheapest if expected performance is superior)*
  - Recommend to client to engage selected agencies *for pre-design testing work*
  - Instruct contractor to engage selected agencies *for work during construction phase*
- ❑ Notify successful agencies
  - Arrange for client to sign formal agreements *for pre-design testing work*
- ❑ Advise unsuccessful agencies *(this maintains good relations: you may want to consider engaging them in future)*

Pre-design - Geotechnical Inspection and Testing (soils)

1. Define scope of work:

a) review requirements in consultation with:
- structural engineer
- testing agency

b) establish number/locations/depth of boreholes for:
- soil/rock sampling
- penetration tests
- moisture content
- groundwater observations

c) other tests *as required*
- probes if rock encountered at shallow depth
- test pits
- percolation tests

2. Define information required:

a) overburden *(usually requiring removal from site, except for topsoil which may be salvageable for use in landscaped areas)*

b) organic material: thickness/depth/layers

c) fill/other non-native material
- moisture content

d) soil/rock type:
- character/formation/origin
- moisture content
- bearing capacity
- depth to bedrock
- inclination of rock surface

e) water table

f) soil analysis

g) unusual conditions, including:
- flowing ground water
- quicksand
- loose rocks/boulders

Report

h) borehole location plan

e) borehole logs

j) soil analysis:
- soil classifications
- stratification
- penetration values
- moisture content

k) recommendations for:
- i) allowable bearing pressure
- ii) foundations, including:
  - design
  - bearing level
  - necessity for skim slab to protect excavated surfaces prior to concrete pour *as required*
  - earth cover to protect footings from frost action *as required*
  - angle of repose for cut slopes
- iii) floor slab construction:
  - compaction of exposed subgrade *by proofrolling, etc. as required*
  - compacted sub-base
- iv) pavement construction:
  - compaction of exposed subgrade *as required*
  - compacted base/sub-base
- v) excavation/handling of rock slabs *as required*
- vi) groundwater control
- vii) special requirements for unusual conditions such as deep foundations or engineered fill

l) confirm project schedule/deadlines

Commonly Specified Inspection and Testing Services during Construction

Charges for these services are usually paid from specified Inspection & Testing allowance or included in contract price of relevant sub-trade. Payment for retesting/reinspection of work found defective following initial inspection, or as otherwise made evident, is responsibility of contractor

- ❑ In all cases, agreed contract administration procedures must be followed for:
  - site attendance
  - reporting
  - lines of communication
  - site instructions
- ❑ Monitor each agency's performance and advise promptly if not satisfactory

Additional Geotechnical Inspection and Testing Services

- ❑ Additional boreholes to augment those taken earlier *may be required as unusual/unexpected conditions become evident as excavation/site work proceeds*
- ❑ Tests of soil-bearing capacity
- ❑ Test pits *as required*
- ❑ Observation/measurement of:
  - additional excavation of unacceptable material
  - related additional backfilling *as specified*
  - boulders over specified size
  - *charges for the above measured quantities are usually at unit rates quoted at time of bidding*
  - topsoil salvaged for re-use

Backfilling

- ❑ sieve analysis of proposed fill materials
- ❑ compaction tests including frequency and number of tests per specified area or at specified lift interval
  - undisturbed excavated surfaces prior to backfilling/placement of footings
  - backfilling under floor slabs/paving
  - backfilling against walls
  - backfilling at site areas following removal of unacceptable material

Asphalt Paving

- ❑ compaction tests:
  - sub-base
  - base
- ❑ inspection of asphalt placement:
  - mixture temperature
  - placing
  - rolling

Special Foundations

- ❑ caissons:
  - drilling
  - bearing surface
- ❑ piles, including:
  - driving of piles
  - load tests
- ❑ underpinning
- ❑ shoring

Concrete

- ❑ air entrainment
- ❑ slump
- ❑ cylinder tests, specified frequency for each test (at least once per prescribed quantity delivered/placed or each placement day)
- ❑ core drilling *as required*
- ❑ load tests *as required*
- ❑ reinforcement, including:
  - bar sizes
  - placement
  - tying
  - chairs/spacers

Masonry

- ❑ masonry materials *as required*:
  - absorption rate for clay brick
  - mortar
  - masonry ties

Structural Steel

- ❑ off-site fabrication:
  - mill test reports
  - materials/products as specified
  - conformance to reviewed shop drawings, including:
    - correct sizes
    - fabrication/erection tolerances
    - welding
- ❑ field assembly, including:
  - bolting
  - welding
  - plumbness/alignment/level
  - base plate grouting/removal of shims

Steel Decking

- ❑ mill test reports
- ❑ no damaged/deformed materials incorporated in work
- ❑ attachments, including:
  - welding
  - button punching
- ❑ reinforcing at openings
- ❑ edge closures, including:
  - flute closures
  - bent plate edge forms

Metal Fabrications

- ❑ handrails/guards, including:
  - fastenings
  - vertical/horizontal load capacity *as specified*

Membrane Waterproofing

- ❑ pre-construction conference
- ❑ condition of substrate
- ❑ installation, including:
  - daily or more frequent inspections throughout duration of work *as required*
  - substrate preparation
  - application

Sprayed Plaster Fireproofing

- ❑ conformance to product data/test reports, including:
  - bond to substrate
  - thicknesses for required ratings

Roofing

- ❑ daily or more frequent inspections throughout duration of work *as required*
- ❑ condition of substrate such as steel deck/ concrete slab
- ❑ inorganic moisture-resistant rigid underlayment
- ❑ vapour retarder, including:
  - mopped in/adhesive fixed *as required*
  - placement of adhesive
  - sealed at:
    - all laps
    - terminations
    - perimeter air/vapour barrier(s)
- ❑ insulation, including:
  - mechanical fastening/mopped in *as required*
  - joints/ends staggered
  - fitted around drains/vents/curbs/ abutting construction
- ❑ roofing membranes, including:
  - mopped/torched *as required*
  - membrane/bituminous flashings
  - granular surfacing *as required*
  - temporary water cut-offs
  - control joints

- ❑ roof pavers/roof protection course
- ❑ sheet metal flashing, including:
  - fabrication
  - joints
  - corners
  - underlay *as required*
  - backpainting *as required*
  - provision for expansion
  - caulking

Sealants

- ❑ field quality control provided by manufacturer's representative *as specified*, including :
  - substrate preparation
  - application of packing and sealant

Finish Hardware

- ❑ field quality control provided by manufacturer's representative *as specified, including:*
  - installation
  - operation/adjustments as required for items such as door closers, automatic door openers

Flooring

- ❑ field quality control provided by manufacturer's representative *as specified* for:
  - resilient sheet flooring, including:
    - seam welding
    - integral cove bases
  - carpeting

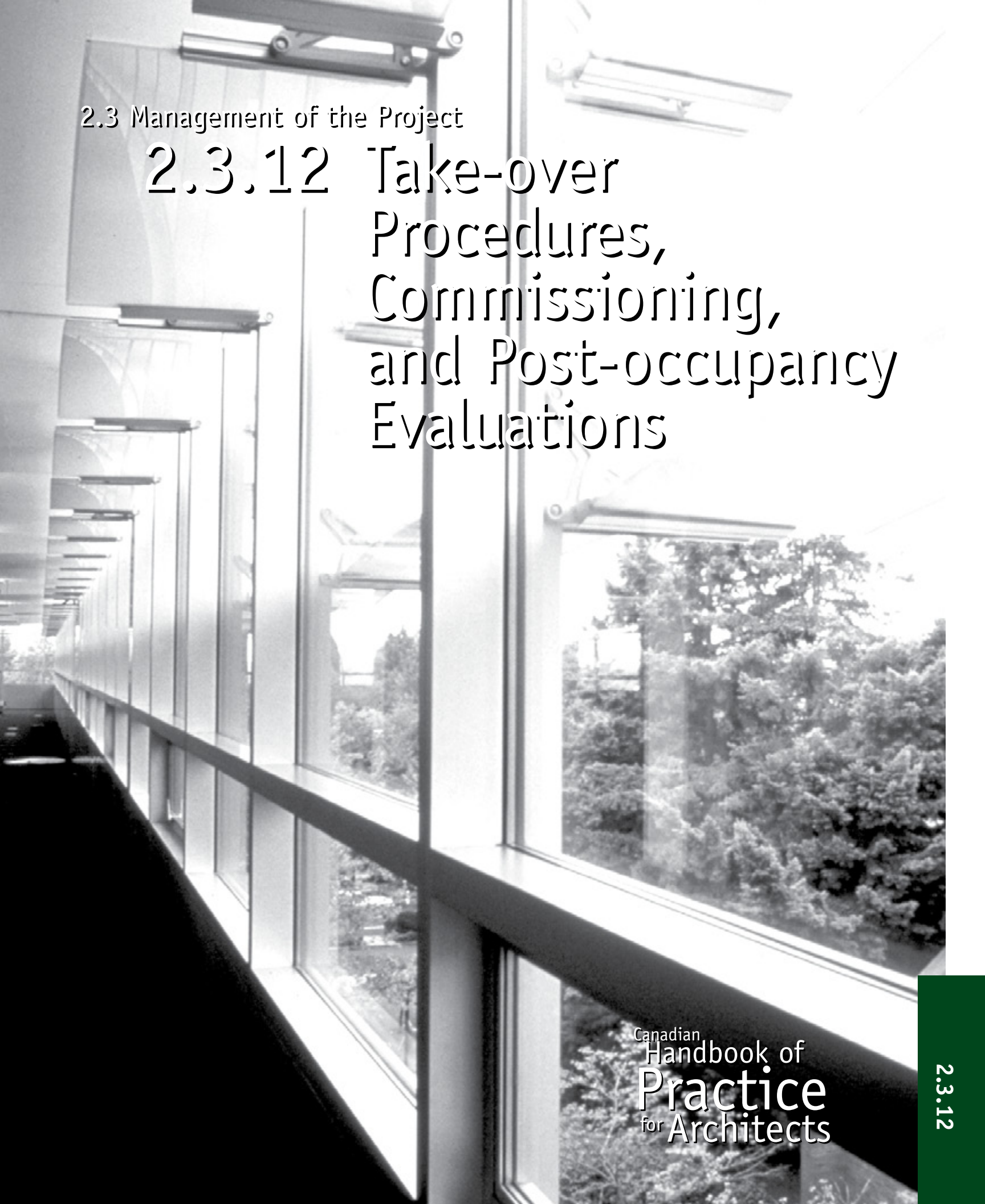
Painting & Finishing

(NOTE:several provinces now have quality assurance programs offered by their provincial Painting Contractors' Associations (PCA). Costs of the program are included in the contract price. These services are recommended for specification by architects, if available. Such programs include:

- ❑ *Approved Product Lists for all Canadian paint manufacturers, listing Coating and Finishing Systems for all exterior and interior conditions*
- ❑ *Warranty/Guarantee, either:*
  - *PCA 2 year Guarantee for PCA members*
  - *Maintenance Bond for non-PCA painting contractors*
  - *Field Quality Control independent inspection service)*
- ❑ Field quality control provided by independent inspection *as specified:*
  - condition of substrate, including:
    - clean/dry/free of imperfections
    - no adverse moisture content/alkalinity
  - preparation, including:
    - products from PCA Approved Products Lists *as specified*
    - priming/filling
    - ventilation
    - temperature
  - application, including:
    - coverage
    - touch-up
    - finished appearance

Special Finishes

- ❑ field quality control provided by manufacturer's representative *as specified*
- ❑ dry film coating thicknesses *as specified*



2.3.12 Take-over Procedures, Commissioning, and Post-occupancy Evaluations

Introduction

Take-over Procedures
- Substantial Performance
- Certification of Release of Holdback
- Final Certificate for Payment
- Letters of Assurance
- Final Submissions
- Occupancy

Commissioning
- Pre-occupancy Services
- Component Verification
- Systems Verification

Warranty Review

Post-occupancy Evaluations

Definitions

References

Appendix A – Letter to Client at Project Completion

Checklist: Maintenance of Architectural Components

Checklist: Replacement of Building Components

Take-over Procedures, Commissioning, and Post-occupancy Evaluations

Introduction

As the construction of a project nears completion or after the building is complete, the architect continues to provide professional services to the client. Some of these services include:

- take-over procedures;
- commissioning;
- post-occupancy evaluation.

Take-over procedures are a normal part of the architect's basic services performed at the end of contract administration. After take-over, the architect is responsible for reviewing defects and deficiencies during the warranty period and for notifying the contractor of items to be corrected. Most client-architect agreements terminate after the one-year warranty period. Therefore, work extending beyond this period is an additional service.

Commissioning is a systematic process of ensuring that new building systems perform interactively according to the documented design intent and the owner's operational needs, and that specified system documentation and training are provided to the facility staff.

Commissioning is a term often misused to refer to those activities that occur when a project is taken over by the client. In actual fact, commissioning is a separate and distinct service, which may commence at the beginning of a project and may continue until occupancy by the owner. Take-over, by contrast, starts when a project nears construction completion. Commissioning is an additional service often provided by an independent third party — a commissioning agent. Large or complex projects may require the participation of a commissioning agent to manage and verify the performance of all the components of the building's operation, in particular testing and balancing of mechanical and electrical systems. [Note: some clients continue to use the term "commissioning" to describe take-over procedures.]

Post-occupancy evaluation is a service provided to investigate and assess the performance of completed buildings. The evaluation may examine the technical performance of a system or an assembly such as the building envelope, or functional performance such as the efficiency of the layout of the building's interior.

Following occupancy, the architect often:

- reviews the effectiveness of the architectural practice's in-house procedures;
- records information about the project for future reference;
- prepares presentation material for incorporation into the practice's promotional material.

Take-over Procedures

Take-over procedures are required for the orderly take-over and transition of the building project by the owner. They are also necessary to protect the interests of the owner, the contractor, and the architect. Architects should be thoroughly familiar with the lien legislation in the province or territory where the project is located.

Refer to the references at the end of this Chapter, for a web link to the lien legislation in each province and territory.

Substantial Performance

The first step in the take-over process is certification of substantial performance of the work. Under the terms and conditions of CCDC 2, *Stipulated Price Contract*, and if permitted by the local lien legislation, the contractor may apply for early release of the holdback related to a sub-contractor's or supplier's work which was substantially performed earlier (such as structural steel fabrication and erection). The architect should review the definition of substantial performance in the appropriate lien legislation.

The Ontario Association of Architects has prepared detailed Practice Bulletins providing advice on the release of holdback monies for subcontracts which are certified as complete, such as those for excavation and foundation subcontracts, to allow for the early or progressive release of holdback.

Some provinces require the certificate to be on a form prescribed by the legislation. The contractor may also be required to arrange for the certificate to be published in a construction trade newspaper. The architect should request proof of the publication date. The publication serves as formal notification to all sub-contractors and suppliers who have the right to place a lien on the project that the period for making a lien claim will expire within a certain number of days, as defined in the provincial or territorial lien legislation, from the date of publication.

The warranty period for the project commences on the date of certification of substantial performance of the total contract.

It is possible to waive the Certificate of Substantial Performance and to proceed directly to a statement of total completion (as defined in the lien legislation). In this case, the warranty period commences on the date of total completion. This is often used on small projects when the time period between substantial performance and total completion is short.

Certification of Release of Holdback

The architect prepares a certificate authorizing payment of the amount of holdback which has accrued to the date of substantial performance. The certificate should be dated for payment one day after the termination of the lien claim period. When issuing the release of the holdback certificate, the architect should advise the owner to ensure that no liens have been registered or notices of liens have been received. Typically, the owner will instruct his or her lawyer to undertake this determination. The architect should **not** perform this legal service; however, the architect should notify the owner that, if no liens exist, the holdback is payable on the date of the certificate.

The terms of CCDC 2 require the owner to place the holdback amount in a bank account (if a separate holdback account has not already been established), in the joint names of the owner and the contractor, ten days before the expiry of the holdback period. In some provinces, such as British Columbia, the lien legislation requires that the holdback monies be paid into a holdback trust account with each and every progress payment to the contractor.

The holdback monies are a trust fund; this fund is **not** intended to enforce the performance of the contractor nor to ensure that deficiencies are corrected. **Certification of payment for known deficiencies should never be made until the performance of the work is acceptable.**

Final Certificate for Payment

Once the architect is satisfied that **all** deficiencies have been corrected and that all work under the contract has been completed, the contractor can apply for payment for the outstanding amount. The final completion or correction of deficiencies can be frustrating for the architect for the following reasons:

- progress towards final completion of outstanding deficiencies seems to be very slow;
- the architect's authority to certify payments and thus influence the contractor to work expeditiously decreases once the major part of the holdback has been released;
- many contractors tend to lose interest in the project when there is no longer a significant financial incentive for its completion, particularly when the outstanding work is the responsibility of sub-contractors.

The architect then prepares and issues the final Certificate for Payment. The date on this

certificate will usually be the date of *deemed completion* of the contract, but, in some circumstances, the deemed date of completion may be an earlier date. In either case, the certificate should specifically confirm the deemed date of completion as stated in the statement of completion.

The definition of *completed*, in some provincial lien acts, permits a small dollar value to remain outstanding. This outstanding amount is the cost of:

- actual total completion;
- correction of known defects;
- last supply of services or materials.

The architect also prepares a certificate for the release of the remaining holdback monies on this final amount, based on the number of days defined in the lien legislation after the date on which the contract is deemed to be complete.

If the contractor is efficient in correcting all the deficiencies, the date of this certificate may precede the date for release of final holdback.

OAA/OGCA Take-Over Procedures, Document 100, is an excellent reference, which graphically explains and charts the take-over procedures and the transferring of the project from the contractor to the owner. It is written in the context of CCDC 2 and the amended *Construction Lien Act, 1990, as amended 2006,* of Ontario.

Letters of Assurance

In some jurisdictions, Authorities Having Jurisdiction require a Letter of Assurance from the architect or registered professional that building has been constructed in substantial compliance with the building code, applicable regulations, and the construction documents accepted for building permit purposes. The Letter of Assurance may be required before an Occupancy Permit is issued.

Final Submissions

Prior to occupancy of the building by the owner, the contractor forwards various items and documentation to the architect for review. These may include:

- operations instructions and maintenance manuals;
- a complete set of keys;
- record documents, which may include shop drawings;
- maintenance materials and spare parts;
- warranties;
- certification of the operation of various systems, such as:
  - fire alarm;
  - sprinkler system;
  - HVAC systems;
  - security system;
  - boiler plant.

The architect and the engineers usually scrutinize these items carefully, because they may be inaccurate or incomplete on first submission and require re-submission before they are acceptable. If the submission process is left to the last minute, the unacceptability of the documentation can delay the completion of training sessions and performance testing. It is good policy to notify the contractor of the amount of the contract that cannot be certified until submissions are satisfactory.

The final submission may be in two stages:

- Stage 1: those items required for the proper operation of the premises for occupancy and, therefore, for certification of substantial performance;
- Stage 2: those items necessary to complete the contract.

In addition to final submissions, it is typical to arrange for a demonstration of all building systems with the following present:

- the owner or owner's designated representative;
- the owner's maintenance personnel;
- the design professionals;
- the sub-contractors or trades responsible for the systems;
- the Authorities Having Jurisdiction (for certain systems only, such as testing of fire alarm systems).

Occupancy

Building occupancy typically occurs as a result of one of three situations:

"Unconditional" Occupancy
Unconditional Occupancy occurs when the scope

of work associated with a building permit and building code compliance is complete and accepted. The Authority Having Jurisdiction formally issues an Occupancy Permit, or Occupancy Certificate, or simply a Notice of Final Inspection.

Conditional Occupancy
Conditional Occupancy occurs when a building, or portion thereof, maybe considered safe but is incomplete with respect to the scope of work shown on the construction documents submitted for the building permit, or with respect to the permit conditions or substantial building code compliance.

Phased (or Partial) Occupancy
Phased (or Partial) Occupancy occurs when a discrete, or stand-alone, portion of a building is complete with respect to the scope of work shown (for that portion) on the construction documents submitted for the building permit, or with respect to the permit conditions or substantial building code compliance.

In all situations noted above, the final issuance of an Occupancy Permit (or local equivalent) or the authorization of a conditional or phased (or partial) occupancy is the role of the Authority Having Jurisdiction. It is advisable to check with the provincial or territorial association of architects for advice on documentation to support conditional and phased occupancy. Normally additional services are required and fees are justified for phased occupancies.

Commissioning

Commissioning includes a range of activities undertaken to transform the design of a facility into a fully integrated and operating system. It is a process of quality assurance which:

- begins with the definition of the "design intent" and ends with the delivery of a building;
- confirms the contractor's implementation of the architect's design as defined in the contract documents;
- confirms the ability of the architect's design to satisfy the client's defined requirements;
- addresses any shortcomings.

One product of the commissioning process may be an accurate project database.
A new guideline, Guideline 0-2005, *The Commissioning Process*, from the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) describes how to verify that a facility and its systems meet the owner's project requirements.

For large and complex projects, the owner may engage a commissioning agent as an independent third party to verify that both the facility design and the resulting construction satisfy the client's objectives and requirements. In addition, the commissioning agent verifies the contractor's performance of the contract. Early involvement of a commissioning agent as a project team member can assist in clear communication of the design intent to both the architect and the contractor.

The commissioning agent can:

- provide useful and objective input to the problem-solving process;
- oversee and verify results by conducting tests.

Commissioning and the services of a commissioning agent are over and above the architect's normal fee.

Pre-occupancy Services

Commissioning may begin at the pre-design stage of a project with an interpretation of the client's expectations in the functional program. Refer to Chapter 2.3.4, *Pre-design*, for information on functional programs.

The client's expectations are documented, working from the general to the specific, in order to develop a logic diagram. The design intent identifies paths of activity necessary to accomplish stated goals. The logic diagram and the functional program should be reviewed regularly during the project's design stages and construction. The architect's responsibility is to communicate the design intent to the building constructor and, ultimately, to the building operator. Commissioning is a quality assurance tool to achieve this.

Because the contractor is usually a late arrival to the project team, an explanation of the verification and testing procedures by the commissioning agent should appear in the bid documents. This will assist bidders in evaluating the time and cost implications of a commissioning agent's participation and the agent's impact upon acceptance of the work.

Bid documents prepared with input from the commissioning agent should include:

- the commissioning plan, including the scope and sequence of the commissioning program;
- the commissioning specifications, including a manual with examples of verification forms and testing procedures, noting probable duration;
- any specialized documentation related to testing, such as CSA Standards, which may describe options for testing methods;
- standards for submission and acceptance of:
  - shop drawings;
  - contractor's tests;
  - product, system, operations, and maintenance manuals;
  - training programs;
  - post-occupancy or seasonal testing;
- the consequences of non-compliance.

Component Verification

The use of performance specifications often results in the supply of components with service characteristics or operational outputs which require minor revisions to the design. The component verification process is an excellent tool to highlight these variances. The commissioning agent should prepare checklists for the verification of each construction element to be tracked, using the risk management assessment classifications — such as *fundamental, critical,* and *essential* — to record compliance with the specifications. In the case of material substitutions, variances from the specifications must include a written statement of recommendation for acceptance by the architect and the acceptance by the owner. Shop drawings and mock-ups are documented, as are the results of tests and the receipt of manuals and warranties.

Systems Verification

The process of systems verification begins after all components within the system are accepted and deficiencies are corrected. The architect and the engineers normally agree upon contract values for items in the verification program so that the contractor is aware of the potential financial impact on progress billing applications and subsequent Certificates for Payment. The contractor's schedule for the timing, sequencing, and proving of systems will require regular commissioning meetings to ensure that all parties are available to:

- verify that all prerequisites to testing are in place;
- review test procedures and acceptable results;
- witness tests.

Attendance at testing procedures by the independent commissioning agent and by the future building operator is beneficial.

Systems verification procedures may require:

- extra time due to the demonstrations of various controls;
- specialized equipment, such as:
  - pressure testing;
  - thermal-scanning of the building envelope.

The timing and circumstances of verification and testing are often beyond the contractor's control, as happens when testing for part of the HVAC systems must be done in a different season.

Failure to verify can seriously affect the construction schedule and can result in delays and claims. To avoid delays:

- have the trades responsible prove or test systems prior to witnessing by the commissioning agent;
- provide for trade and sub-trade acceptance on verification forms prior to contractor acceptance.

After sign-off by the contractor, the consultants will then certify their recommendation of acceptance using standard verification sheets. Variances from the design identified during systems testing will require investigation and reporting by the architect and the engineers. Testing after occupancy can release the contractor from continuous attendance on the site.

Because many integrated systems tests require that certain post-occupancy conditions be in place (for example, all equipment, furnishings, and building users in operation), the architect and the commissioning agent should consider preliminary or conditional testing and recommended acceptance of certain sub-systems. If alteration to the design is required, it must be carefully documented and the project data base altered to suit.

A recommendation by the architect or the engineer to deny acceptance of a system may result in a dispute by the contractor over the design. For this reason, the architect should always provide a method of dispute resolution in the contract.

Once conditional acceptance is established, a building operator training program can be started. Before beginning a training program, the owner's building operator must have:

- complete and accurate operating and maintenance manuals;
- a description of the systems' intended operation;
- the warranties and information outlining maintenance contracts.

Warranty Review

The architect will be responsible for reviewing defects and deficiencies during the warranty period on behalf of the client and for notifying the contractor of items requiring attention. Prior to the anniversary date of the one-year warranty, the architect should arrange a review of the project. The review should include:

- the architect;
- the engineers;
- the client, and probably the client's operations and maintenance personnel;
- the contractor;
- the commissioning agent (if there is one on the project).

After a review of each situation, the architect:

- directs the contractor to correct the problem as required under a typical construction contract; or
- advises the client to deal with the condition, because it is a maintenance problem.

A summary of problems and construction deficiencies should be compiled. The architect verifies the accuracy of the list and forwards it to the contractor, before the contractor's obligations under the contract expire.

If the contractor fails to rectify a warranty item in a reasonable time, the architect may review the client's rights under the bonding and insurance provisions in the contract.

The architect may conduct periodic reviews of the project following occupancy to confirm with the client or the client's personnel that all systems are operating. These reviews determine how well the client's personnel understand the operations manuals and any programmed default settings within the systems. The architect should also advise the client that alterations to any work by the client's own forces during the warranty period may void portions of the contractor's obligation under the contract.

During the first year of operation, it is usually necessary to confirm the performance of mechanical or electrical systems which are used primarily during a certain season of the year. The architect must arrange for such inspection and verification with the engineers (and possibly with the commissioning agent). The contractor must demonstrate that these systems, which were conditionally accepted at the time of substantial performance, satisfy all design requirements before the architect can recommend final acceptance. The architect must document any adjustment or revision to these systems as well as modify the project database and the owner's appropriate operating and maintenance manuals.

The architect and the contractor may be called upon to account for deficiencies uncovered during post-occupancy, either as a result of defective workmanship or the original design.

Post-occupancy Evaluations

Post-occupancy evaluations:

- review a building's performance;
- assess how well the building matches users' needs; and
- identify ways to improve building design, performance and fitness for purpose.

These evaluations, which are an additional service beyond the architect's normal services, may review:

- functional performance, including:
  - social and behavioural review;
  - efficiency of spatial arrangements;
- technical performance such as the performance of building envelope or finishes.

When evaluating functional performance, the architect attempts to quantify and measure performance in terms of explicitly stated needs of occupants and users. Occupational therapists and social scientists have developed useful information in this field. However, many architects who are experienced programmers may also be qualified to provide valuable feedback on user needs. In many cases, these needs would have been defined in the original functional program for the project. Refer to Chapter 2.3.4, *Pre-design*.

Post-occupancy evaluations, which may include a technical review of the building and certain architectural components such as finishes or the building envelope, are used to develop a long-term maintenance plan or the requirements for future projects.

Post-occupancy evaluations assist clients — especially those who undertake many repeat buildings, such as retail outlets and fast-food restaurants — to determine how their future facilities may be improved and how costs may be reduced. Post-occupancy evaluations also assist in improving ergonomics and in developing new functional programs and plans for facility management, future renovations, and master plans.

Finally, the post-occupancy evaluations may review the method of project delivery and contractual arrangements to determine how to improve the design, contract documents, and project management methods for future projects.

Definitions

Certificate: A document attesting to the truth of a fact; in construction, a certificate is prepared by a professional, either an architect or an engineer.

Certificate of Substantial Performance: A certificate issued under the appropriate lien legislation attesting that the contract between the owner and the contractor is substantially complete.

Guarantee: A three-party agreement in which the third party (such as a surety) guarantees the performance of an obligation to the second party (such as an owner) in the event of default of the first party (such as a contractor). (adapted from CCDC)

Holdback: A percentage of the monetary amount payable under a (construction) contract, which is held as security for a certain period of time. The percentage and period of time are based on the provincial lien legislation.

Lien: A legal claim on real property to satisfy a debt owed to the lien claimant by the property owner. This claim can carry the right to sell the property upon default.

Maintenance: The act of keeping a building system, process or property in proper and efficient working condition.

Post-occupancy Evaluation: An assessment of the performance of a building after the building has been occupied. The evaluation may address one or more different aspects of building performance.

Warranty: A two-party agreement which provides an assurance by a builder or a seller of goods (such as a contractor, sub-contractor, or supplier), to a purchaser (such as an owner), that the warrantor will assume stipulated responsibilities for correction of defects in the goods within a stated period of time. (adapted from CCDC)

References

AABC Commissioning Group, *ACG Commissioning Guideline for Building Owners, Design Professionals and commissioning Service Providers*, 2005.
www.commissioning.org

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Guideline 0-2005, *The Commissioning Process*.

Canadian Construction Documents Committee. Ottawa, Ont.
Construction Warranties (bulletin), November 1998.
Warranty vs. Guaranty (bulletin), November 1998.

Cooper, Barbara A.; S. Ahrentzen; and B. Hasselkus. "Post-occupancy Evaluation: an environment-behaviour technique for assessing the built environment." *Canadian Journal of Occupational Therapy*, 1991. (This publication contains a lengthy reference list.)

Ontario Association of Architects (OAA) and Ontario General Contractors Association (OGCA). OAA/OGCA *Take-Over Procedures*, Document 100. Toronto, Ont.: OAA/OGCA.

Web Links to Provincial and Territorial Lien Legislation

British Columbia
Builders Lien Act, S.B.C. 1997, c.45 as amended
www.bclaws.ca/Recon documentfreeside/--%20b%20--/builders%20lien%20act%20%20sbc%201997%20%20c.%2045/00_97045_01.xml

Alberta
Builders Lien Act, R.S.A. 2000, c. B-7
www.qp.gov.ab.ca/documents/Acts/B07.cfm?frm_isbn=0779726944

Saskatchewan
Builders Lien Act, Chapter B-7.1 S.S., 1984-85-86 as amended
www.qp.gov.sk.ca/documents/English/Statutes/Statutes/B7-1.pdf

Manitoba
The Builders' Liens Act, C.C.S.M. c. B91 as amended
web2.gov.mb.ca/laws/statutes/ccsm/b091e.php

Ontario
Construction Lien Act, R.S.O. 1990, c. C30 as amended
www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90c30_e.htm

Quebec
Civil Code, articles 2724-2732, 2952
www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=2&file=/CCQ/CCQ_A.html

New Brunswick
Mechanics Lien Act, R.S.N.B. 1973, c. M-6 as amended
www.gnb.ca/0062/acts/acts/m-06.htm

Nova Scotia
Builders' Lien Act, R.S.N.S. 1989, c. 277 as amended
www.gov.ns.ca/legislature/legc/statutes/bldersln.htm

Prince Edward Island
Mechanics' Lien Act, R.S.P.E.I. 1988, c. M-4
www.gov.pe.ca/law/statutes/pdf/m-04.pdf

Newfoundland and Labrador
An Act respecting the Liens of Mechanics and Others, R.S.N. 1990, c. M-3
www.assembly.nl.ca/legislation/sr/annualstatutes/RSN1990/M03.c90.htm

Northwest Territories
Mechanics Lien Act, R.S.N.W.T. 1988, c.M-7
www.justice.gov.nt.ca/PDF/ACTS/Mech_Lien.pdf

Appendix A - Letter to Client at Project Completion

The final letter from the architect to the client upon completion of a building project is an opportunity for the architect to review the functional programming and performance objectives that were discussed and agreed to early in the project development. The letter should also inform the client about some more practical matters.

The recommended contents of the letter include:

1. Summary of Design Principles

This includes a summary of the principles which governed the design of the building and its mechanical and electrical systems, particularly in relation to energy efficiency and sustainability. This will not only assist the client in understanding how the new building is designed to function, but will be a guide to establishing and managing operating procedures for sophisticated automated building control systems.

2. Maintenance Manuals

This is a reference to the Maintenance Manuals that were forwarded to the client earlier and which contain essential and valuable information on the materials and systems in the building. The client should be encouraged to use these manuals routinely as the first source for information on the operation and maintenance of the building.

3. Maintenance Checklist

A Maintenance Checklist is a guide to the client in establishing normal/routine maintenance procedures for the building (sometimes referred to as "Planned Maintenance").

Refer to the Checklist CH-51 at end of Chapter 2.3.12.

4. Checklist – Replacement of Building Components

This checklist should identify major building components (which have shorter life expectancies than the anticipated occupancy period) and which will require the client to plan and budget for their upgrading and/or replacement at various intervals before the end of the building's useful life (sometimes referred to as Capital Asset Management).

Refer to the Checklist CH-52 at end of Chapter 2.3.12.

*[Note: The two Checklists mentioned above are for the architect's use as a **guide only** in preparing project-specific information, which should be enclosed with the letter to the client.]*

5. Services during the Construction Contract Warranty Period

This refers to a description of the architect's services to be provided during the warranty period for the construction contract, which include:

- review of defects and deficiencies;
- notification of the contractor of defects and deficiencies as they are identified;
- follow-up with the contractor; and
- inspection and reporting at the end of the warranty period.

6. Other

This might include any other relevant information the architect may wish to add including comments of the architect's choosing, appropriate to the relationship with the client and the prospect of future commissions. In addition, the architect may offer to carry out post-occupancy evaluation services, for additional fees to be negotiated.

References

International Facilities Management Association. Asset Lifecycle Model for Total Cost of Ownership Management – Framework, Glossary & Definitions. 2005

Checklist: Maintenance of Architectural Components

General Notes

This Checklist is intended as a general guide for use by the building owner/facilities manager for routine inspections, repairs or touch-up at the intervals noted. It does **not** address every specific item relevant to every building type nor does it address cleaning and typical janitorial tasks. Maintenance Manuals provided to the owner by the general contractor upon completion of the project will contain more detailed information and should be referred to by the owner/facilities manager on a regular basis.

This Checklist deals primarily with architectural items; therefore, the architect should consider augmenting the consulting engineers' scope of work by adding the preparation of similar, more detailed, lists for structural, mechanical and electrical items requiring routine inspections.

Comments, clarifications or recommendations are in *italics*.

Use of a forward slash (/) in the Checklist signifies *and* or *or*

Frequently (maximum interval: monthly):

Windows/Entrances:
- ❑ operating entrance hardware; *adjust or replace as required:*
  - ❑ locks/lock sets;
  - ❑ closers;
  - ❑ automatic openers;
  - ❑ access systems;
- ❑ loose/detached thresholds; *adjust or replace as required.*

Interior Doors:
- ❑ operating hardware; *adjust or replace as required:*
  - ❑ locks/lock sets;
  - ❑ closers;
  - ❑ automatic openers;
  - ❑ electro-magnetic hold-opens.

Accessories:
- ❑ loose corner guards/wall bumpers/grab-rails; *adjust or replace as required:*
- ❑ toilet compartments; *adjust or replace as required:*
  - ❑ door hardware;
  - ❑ support brackets/anchors.

Twice Per Year (spring and fall):

Roofing/Flashings:
- ❑ remove accumulated debris from:
  - ❑ perimeter of roof;
  - ❑ drains/gutters/downspouts;
- ❑ observe general condition, paying particular attention to:
  - ❑ surfaces/seams/roof drains;
  - ❑ perimeter conditions: cants/curbs/ridges/valleys.

Skylights:
- ❑ broken or damaged glass;
- ❑ transparency loss in double/triple glazing;
- ❑ physical damage to frames;
- ❑ failed anodizing/painted coatings;
- ❑ evidence of leakage;
- ❑ glass to frame sealants;
- ❑ perimeter caulking.

Room Dividers/Folding Walls:
- ❑ operation:
  - ❑ tracks;
  - ❑ trolleys;
  - ❑ electrical components;
- ❑ sound seals:
  - ❑ between panels;
  - ❑ top;
  - ❑ operable floor seals;
- ❑ latching/locking;
- ❑ panel skins:
  - ❑ adhesion;
  - ❑ wear/soiling/physical damage.

Mechanical Systems *partial list*:
Follow manufacturers' recommendations for routine inspection and maintenance schedules found in Maintenance Manuals provided by Mechanical Contractor upon project completion. *(Note: The customized list should include items such as air and water filter replacement, maintenance of HVAC, chillers, boilers, plumbing, extinguishing systems, back flow prevention systems, refrigeration and pumps, etc.)*

Electrical Systems *partial list*:
Follow manufacturers' recommendations for routine inspection and maintenance schedules found in Maintenance Manuals provided by Electrical Contractor upon project completion. *(Note: The customized list should include cleaning and replacement of lighting reflectors/lenses/ other lighting surfaces and exit signs; vacuum service entrance board/interior of all panel boards; primary and secondary systems, emergency electrical systems, UPS, master clocks, fire/life safety systems and alarms, remote monitoring, elevator maintenance, etc.)*

Every Year:

Grounds (including roadways, sidewalks, pavers, catch basins, storm sewers, landscaping, etc.)

Exterior and Interior Signage

Below-Grade Concrete or Masonry Walls:
- ❑ indications of stress/settlement:
  - ❑ cracks/shearing;
  - ❑ water leakage;
- ❑ efflorescence/spalling on interior surfaces *in occupied/unoccupied spaces*.

Exterior Wood (painted/natural finish):
- ❑ coatings (flaking, chipping, chalking, weathering);
- ❑ fungal decay/insect infestation;
- ❑ vegetation *too close*;
- ❑ evidence of decay in beam ends/outriggers.

Exterior Masonry:
- ❑ cracked/disintegrating mortar joints;
- ❑ loose bricks/blocks;
- ❑ plugged weeping holes and slots;
- ❑ indications of stress/settlement:
  - ❑ cracks/shearing of masonry units;
- ❑ copings:
  - ❑ loose units/open joints/settlement/loose flashing;
  - ❑ efflorescence/heavy soiling/graffiti requiring removal;
  - ❑ staining by run-off from copings/flashings/ window sills;
  - ❑ caulking, including caulking of expansion joints.

Exterior Exposed Concrete:
- ❑ staining indicating corrosion of reinforcing steel/exposed form tie ends;
- ❑ spalling/cracking/undue wear, where applicable (e.g. stairs).

Exterior Metal (exposed steel/iron, structural/ ornamental):
- ❑ painted/galvanized surfaces, paying particular attention to:
  - ❑ corrosion of anchors/base plates/ends of members abutting dissimilar materials;
  - ❑ exposure to accumulated organic matter standing water on horizontal surfaces.

Exterior Finishes:
- ❑ pre-painted/galvanized steel siding/panels:
  - ❑ edges; *for indications of corrosion due to coating loss;*
  - ❑ condition of surfaces (chalking/crazing/ erosion);
  - ❑ caulking at lap joints;
- ❑ cracking/crazing/staining/mould growth and telegraphing of support system framing of synthetic stucco finishes (EIFS).

Windows/Entrances:
broken or damaged glass;
- ❑ transparency loss in double/triple glazing;
- ❑ physical damage to frames;
- ❑ failed anodizing/painted coatings;
- ❑ glass to frame sealants;
- ❑ perimeter caulking.

Interior Doors and Frames:
- ❑ hollow metal:
  - ❑ condition of painted/galvanized surfaces;
  - ❑ physical damage;
  - ❑ perimeter caulking of frames;
- ❑ veneer/plastic laminate faced wood doors:
  - ❑ delamination of veneers/plastic laminates;
  - ❑ damaged edges/corners;
  - ❑ fading/staining/soiling;
- ❑ vision panels/glazing:
  - ❑ broken or damaged glass;
  - ❑ glass to frame sealants.

Stairs/Handrails/Guards:
- ❑ excessive wear on nosings/treads/landings;
- ❑ rigidity/stability of guards;
- ❑ anchorage/stability of handrails;
- ❑ condition of painted/galvanized surfaces.

Interior Finishes:
- ❑ flooring/bases:
  - ❑ excessive wear in high traffic areas:
    - ❑ top/bottom of stair flights;
    - ❑ corridor corners;
    - ❑ doorways/entrances;
  - ❑ ceramic/precast terrazzo tile:
    - ❑ cracking/crazing;
    - ❑ grout (loss/staining);
    - ❑ loose/damaged base units;
  - ❑ resilient sheet/tile flooring:
    - ❑ curling/lifting/loss of adhesion;
    - ❑ splitting/separation of seams;
    - ❑ adhesion of bases integral with sheet flooring;
  - ❑ carpet/carpet tile:
    - ❑ excessive wear;
    - ❑ pile damage/seam zippering;
    - ❑ curling/lifting/loss of adhesion;
  - ❑ poured seamless flooring:
    - ❑ cracking/loss of integrity;
    - ❑ physical damage.
  - ❑ rubber or vinyl bases:
    - ❑ loss of adhesion;
    - ❑ shrinkage;
- ❑ wall/ceiling finishes:
  - ❑ painted surfaces:
    - ❑ fading/staining/soiling;
    - ❑ drywall (cracks/nail pops);
  - ❑ natural finished surfaces:
    - ❑ wear/crazing/cracking/soiling;
  - ❑ ceramic tile:
    - ❑ cracking/crazing;
    - ❑ grout (loss/staining/mould);
    - ❑ perimeter/corner caulking;
  - ❑ wallpaper/vinyl wall fabric:
    - ❑ fading/staining/soiling;
    - ❑ curling/lifting/loss of adhesion;
  - ❑ ceiling or wall staining, *indicating possible leakage from concealed piping or roofs.*

Cabinetwork/Built-in Furniture/Custom Millwork/ Wall Paneling/etc:
- ❑ delamination of veneers/plastic laminates;
- ❑ damaged edges/corners;
- ❑ fading/staining/soiling;
- ❑ operating hardware:
  - ❑ hinges;
  - ❑ locks/latches;
  - ❑ sliding/folding/tambour doors.

Structural Systems:
- ❑ cracking/deformation caused by settlement or overloading.

Mechanical Systems *(partial list)*:
Follow manufacturers' recommendations for routine inspection and maintenance schedules found in Maintenance Manuals provided by Mechanical Contractor upon project completion; *some of these inspection/maintenance activities may be required at more frequent intervals:*
- ❑ systems:
  - ❑ humidification;
  - ❑ water treatment;
  - ❑ sprinkler;
  - ❑ temperature control;
  - ❑ air balance;
  - ❑ automated building control;
- ❑ special equipment: heat recovery units etc.
- ❑ clean:
  - ❑ strainers;
  - ❑ inside of air handling systems/fans/ ducts/coils/terminal units, etc.;
- ❑ valves:
  - ❑ seals;
  - ❑ missing identification tags;
- ❑ lubricate bearings;
- ❑ check for fan noise;
- ❑ straighten bent fins on all coils on finned radiation elements;
- ❑ vibration isolators;
- ❑ physical damage to pipe/duct/equipment insulation;
- ❑ damaged paint or finishes on equipment.

Checklist: Replacement of Building Components

Introduction

Some major components of a new building do not last as long as others. This fact should be addressed during the life-cycle cost analysis that is usually carried out during the pre-design stage. (However, not all projects go through a life cycle cost analysis in the pre-design stage.) Such an analysis is important in making management decisions for the facility once it has been completed and occupied.

The prudent owner will plan and budget for upgrading or replacing these major components over the mid-term or long-term of the building's projected useful life, thus ensuring that adequate funds will be available when major expenditures are needed. Unfortunately, too many institutions owning a large number of aging buildings face huge maintenance or replacement costs for which little or no funding is available within their operating budgets. The following checklist provides a general indication of the building components which the building owner should monitor on a routine basis (refer to the Maintenance Checklist, CH-50 in Chapter 2.3.12). The owner should also budget for and set aside funds for their upgrading or replacement.

The life of these major components is not easily predictable and depends on many factors, including the quality of the product selected, routine maintenance, intensity of use or loading, wear and tear, severity of local weather conditions, and so on. Manufacturers' claims for their products cannot always be relied upon, although when warranties are offered or specified they are likely to indicate the low end of a product's life expectancy. Electronic products are now common in controls for mechanical and electrical systems and although they may not wear out quickly, they are vulnerable to rapid obsolescence.

Under five years:

- ❑ incandescent and fluorescent lamps;
- ❑ weatherstripping.

Five to ten years:

- ❑ illuminated exit signs;
- ❑ electronic systems and equipment.

Ten to twenty years:

- ❑ synthetic stucco finishes (EIFS);
- ❑ sealed double or triple glazing;
- ❑ resilient sheet/tile flooring;
- ❑ roofing;
- ❑ carpet.

Twenty to thirty years:

- ❑ pre-painted steel siding/panels
- ❑ Major mechanical equipment:
  - ❑ boilers
  - ❑ hot water heaters
  - ❑ main supply and exhaust fans
  - ❑ fan coil units
  - ❑ air conditioning chillers
  - ❑ heat exchangers
  - ❑ heat recovery units
  - ❑ humidifiers
  - ❑ temperature controls/automatic building control system
- ❑ Major electrical equipment:
  - ❑ transformers

2.4 Standard Forms for the Management of the Project

Canadian Handbook of Practice for Architects

Guide to the Use of the Forms

Purpose of the Forms

Other Forms

1. Forms for General Communications

1.1 Memorandum

1.2 Minutes of Meeting

1.3 Transmittal

1.4 Project Team Directory

2. Forms for the Bidding Phase of a Project

2.1 Bid Documents Distribution List

2.2 *Stipulated Price Contract Bid Form*

2.3 Addendum

2.4 *Contractor's Qualification Statement* (refer to CCDC 11)

2.5 *Project Financial Information* (refer to CCDC 12)

2.6 Summary of Bids

2.7 Letter of Acceptance

2.8 Letter to Unsuccessful Bidders

3. Forms for Contract Administration

3.1 Field Review Report

3.2 *Supplemental Instructions* (refer to CCDC 24)

3.3 *Proposed Change* (refer to CCDC 24)

3.4 *Change Order* (refer to CCDC 24)

3.5 *Combined Proposed Change and Change Order* (refer to CCDC 24)

3.6 *Change Directive* (refer to CCDC 24)

3.7 *Summary of Changes* (refer to CCDC 24)

3.8 *Notice* (refer to CCDC 24)

3.9 *Warranty Notice* (refer to CCDC 24)

3.10 *Product Warranty Notice* (refer to CCDC 24)

3.11 Request for Information

4. Forms for Certification

4.1 *Certificate for Payment* (refer to CCDC 24)

4.2 Certificate of Substantial Performance

4.3 *Statutory Declaration Forms* (refer to CCDC 9A, 9B, and 9C)

4.4 *Application for Payment* (refer to CCDC 24)

4.5 *Schedule of Values and Work Performed* (refer to CCDC 24)

4.6 Letters of Assurance

5. Other Forms for Project Management

5.1 Index of Supplemental Instructions

5.2 Drawing Notations

5.3 Shop Drawing Review Notations and Cover Letters

5.4 Log of Shop Drawings and Samples

Note: italics indicate that the Forms are currently available from the Canadian Construction Documents Committee (CCDC); refer to Volume 3 of the Handbook.

Sample Forms for the Management of the Project

Guide to the Use of the Forms

Purpose of the Forms

The forms in this section of the Handbook are provided to assist the architect in managing a project. Standardized forms support effective record-keeping and other functions. As well, many of these forms are needed to fulfil contractual requirements.

The Handbook does NOT duplicate forms which are available from the Canadian Construction Documents Committee (CCDC), such as those in CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*.

Other Forms

This section of the Handbook provides only the basic forms used to manage most architectural projects. Other forms which may be required include:

- **Survey Requirements** (to be provided to land surveyors)
- **Index of Drawings/Sketches**
- **Index of Drawing Revisions**
- **Index of Sub-contractors**
- **Index of Minutes of Meetings**
- **Index of Field Review Reports**
- **Record of Committed Funds** (to track expenditures from a contingency fund)

1. Forms for General Communications

1.1 Memorandum

A memorandum, or memo, is used as a note when a letter or more formal correspondence is not appropriate. When distributed outside the architectural practice, the memo is usually initialed or signed at the bottom of the message or next to the name of the sender. The text should be clear, concise, and correct.

Purpose
A memorandum is used to:

- transfer, confirm, record, and file miscellaneous information both within and outside the office;
- act as a reminder of outstanding business or action required.

Contents
The memo contains the following information:

- recipient;
- sender;
- date;
- file or project name and number;
- title of the subject matter;
- body of text or information.

1.2 Minutes of Meeting

Minutes of Meetings are used to document meetings, including telephone calls or telephone conferences. This form is sometimes called a Meeting Report or Conference Report.

Purpose
The Minutes are a record of items discussed or agreed upon at meetings. This report should include the purpose of the meeting, a list of attendees, and an action column indicating the name of the individual or firm responsible for follow-up.

Contents
The Minutes may provide the following headings:

- project name and number;
- date;
- location;
- purpose of meeting;
- list of attendees;
- record of decisions;
- action(s) required.

1.3 Transmittal

A transmittal is a convenient form which records the routing of drawings, specifications, sketches, shop drawings, samples, product literature, and other documents which are transmitted electronically or by other means.

Purpose
The transmittal is used to:

- record and document the information transmitted;
- record the date of transmission;
- indicate the action expected upon receipt of the information;
- direct the routing and mode of delivery.

Contents
Transmittals contains the following:

- date;
- addressee or recipient;
- project name and number;
- method of transmittal;
- action required;
- itemized list of documents or information;
- remarks or additional notes pertaining to the information;
- names of recipients also receiving same items or information.

1.4 Project Team Directory

This is a complete list of the representatives of the various organizations involved in a project and their contact information.

Purpose
The directory provides a simple, accessible source of contact information for communication purposes.

Contents
The directory should include:

- name of firm or organization;
- name of individual;
- role and/or title of individual;
- address;
- telephone and fax number (usually business telephone, but sometimes emergency or home telephone numbers are important);
- cellular telephone number;
- E-mail address.

2. Forms for the Bidding Phase of a Project

For a general discussion of this phase of a project and for the application and use of these forms, refer also to Chapter 2.3.9, *Construction Procurement*.

2.1 Bid Documents Distribution List

It is important to track the distribution of documents when a project is "out for tender."

Purpose
The list is used to:

- identify all bidders and other recipients;
- record deposits for documents;
- provide a distribution list for addenda;
- provide a checklist to secure the return of documents after bid closing.

Contents
The Bid Documents Distribution List should include the following information:

- project name and number;
- bid closing time and date;
- name, address, E-mail and telephone and fax numbers of all contractors (bidders and other recipients);
- number of sets of documents received;
- date of issue and date of return of sets of documents;
- deposits received and returned;
- number of addenda issued and date of issue.

2.2 Stipulated Price Contract Bid Form

Refer to Chapter 2.3.9, *Construction Procurement,* and to CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts,* for information on developing a bid form.

2.3 Addendum

All addenda must be carefully worded and distributed, as they will form part of the construction contract. Addenda may contain revised or additional drawings. They must be distributed to all bidders and others at the same time, in the same manner, and no later than four days prior to bid closing.

Refer to Chapter 2.3.9, *Construction Procurement,* and to CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts,* for more information on addenda.

Purpose
Addenda are used to:

- provide additional information to be included in the bid documents;
- correct or clarify information in the bid documents;
- identify changes in the instructions to bidders (closing date, time, etc.).

Content
The addendum should include the following information:

- project name and number;
- number and date of the addendum;
- a reference to the appropriate bid document (drawing, specification, instructions to bidders, etc.);
- a detailed description of the new information.

2.4 Contractor's Qualification Statement

Refer to *CCDC Document 11* for a sample form.

Refer to Chapter 2.3.9, *Construction Procurement,* and to CCDC 24, *A Guide to Model Forms and Support Documents,* for information on the use and application of this form.

2.5 Project Financial Information

Refer to CCDC 12, *Project Financial Information,* for a sample form.

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for information on the use and application of this form.

2.6 Summary of Bids

This form is both a record of bids and a tool for analyzing them.

Purpose
The summary of bids:

- provides a list for easy comparison and analysis;
- identifies bids which are non-compliant ;
- is useful as a preliminary record during opening of bids.

Contents
The form must contain the following:

- project name and number;
- bid closing time and date;
- list of contractors submitting bids;
- list of bid amounts;
- list of acceptable bid securities (bid bond, certified cheque, etc.);
- identification of non-compliant bids;
- list of alternatives or proposed substitutions;
- project completion time (if requested in bid documents).

2.7 Letter of Acceptance

Refer to Chapter 2.3.9, *Construction Procurement,* for information on the proper use of this letter. A Letter of Acceptance is normally issued by the client or owner; however, the architect may assist in its preparation.

Purpose
The Letter of Acceptance:

- notifies a successful bidder of the award of contract;
- permits work to start immediately pending the preparation and execution of a formal contract.

Contents
The Letter of Acceptance may include:

- date;
- name and address of successful bidder (contractor);
- project name and number;
- date and amount of the bid;
- directions regarding commencement of the work;
- acceptance of alternatives;
- confirmation of the contract price;
- starting date of commencement of contract.

2.8 Letter to Unsuccessful Bidders

It is both professional and courteous to inform unsuccessful bidders in a timely manner of the award of a contract. The letter can be sent by the architect or the owner.

Purpose
The purpose of this Letter to Unsuccessful Bidders is to:

- notify all bidders of the status of the project;
- permit bidders to make necessary arrangements for bonding and bidding other projects;
- inform bidders of the actual amount of the successful contract.

Contents
The Letter to Unsuccessful Bidders may contain the following information:

- date;
- the name of the successful contractor;
- the contract amount with a brief explanation if this is different from the low bid (acceptance of alternatives, etc.);
- description of the method for returning bid documents and obtaining deposits on these documents;
- indication of the method for return of bid bonds or bid security, if necessary;
- a note of thanks for bidding on the project.

3. Forms for Contract Administration

3.1 Field Review Report

Field Review Reports form a log of observations and actions taken during the construction and post-construction stages of a project. These reports are often supplemented by audio recordings and photographic or video records.

Refer to Chapter 2.3.11, *Contract Administration — Field Functions,* for more information on the preparation of Field Review Reports.

Purpose
Field Review Reports are used to:

- record construction activities summarizing the status of the project at regular intervals
- communicate with and report to the client, authorities, and the contractor on the status of a project;
- manage information;
- assist in processing the contractor's applications for payment and the preparation of Certificates for Payment;
- create a project history to assist in providing documentation and findings regarding possible future claims.

Content
All Field Review Reports should contain the following information:

- project name and number;
- location of project;
- number of the Field Review Report;
- date of visit;
- name of general contractor;
- weather conditions;
- general observations, including stage of construction;
- description of work in progress;
- action required;
- name and title of person performing the review;
- names of organizations and representatives who will receive the report;
- list of attachments;
- comment on previous reports' "action required";
- method of transmission.

3.2 Supplemental Instructions

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* of this Handbook, for information on the use of the Supplemental Instruction Form.

3.3 Proposed Change

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* of this Handbook, for information on the use and application of this form.

3.4 Change Order

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* of this Handbook, for information on the use and application of this form.

3.5 Combined Proposed Change and Change Order

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

3.6 Change Directive

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* of this Handbook, for information on the use and application of this form.

3.7 Summary of Changes

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

3.8 Notice

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

3.9 Warranty Notice

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

3.10 Product Warranty Notice

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

4. Forms for Certification

4.1 Certificate for Payment

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* for information on the use and application of this form.

4.2 Certificate of Substantial Performance

The requirement for a Certificate of Substantial Performance and the type of form varies in each province and territory and is based on the relevant construction lien legislation. The architect should confirm which form is suitable in the province or territory in which the project is undertaken. The applicable lien legislation may prescribe the form to be used for the certification of substantial performance.

Refer to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations* for additional information on substantial performance.

4.3 Statutory Declaration Forms

Refer to *CCDC 9A, 9B,* and *9C* for sample forms.

Refer to *CCDC 24, A Guide to Model Forms and Support Documents,* for information on the use and application of these forms.

4.4 Application for Payment

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* for information on the use and application of this form.

4.5 Schedule of Values and Work Performed

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* for information on the use and application of this form.

4.6 Letters of Assurance

A Letter of Assurance is a requirement in some jurisdictions including the provinces of British Columbia, Alberta and Nova Scotia. All architects practising in these jurisdictions should refer to the appropriate guides regarding Letters of Assurance in the local building codes and in bulletins from provincial association of architects.

Generally speaking, Letters of Assurance must be signed, sealed, and dated by registered architects who are practising (principals) in architectural firms or who hold Certificates of Practice in designated engineering firms.

Purpose
The Letters of Assurance are used to provide certification to Authorities Having Jurisdiction at two milestones:

- application for building permit;
- intention to occupy the building.

Content
Always use the standard form of the Letter of Assurance Assurance from the appropriate jurisdiction for the place of the work. For example, in British Columbia refer to the latest edition of the *British Columbia Building Code* or the Vancouver Building Bylaw equivalent for sample letters.

5. Other Forms for Project Management

The architect can use many forms to assist in the management of a project.

5.1 Index of Supplemental Instructions

Refer to CCDC 24, *A Guide to Model Forms and Support Documents*, for a typical Supplemental Instruction Form.

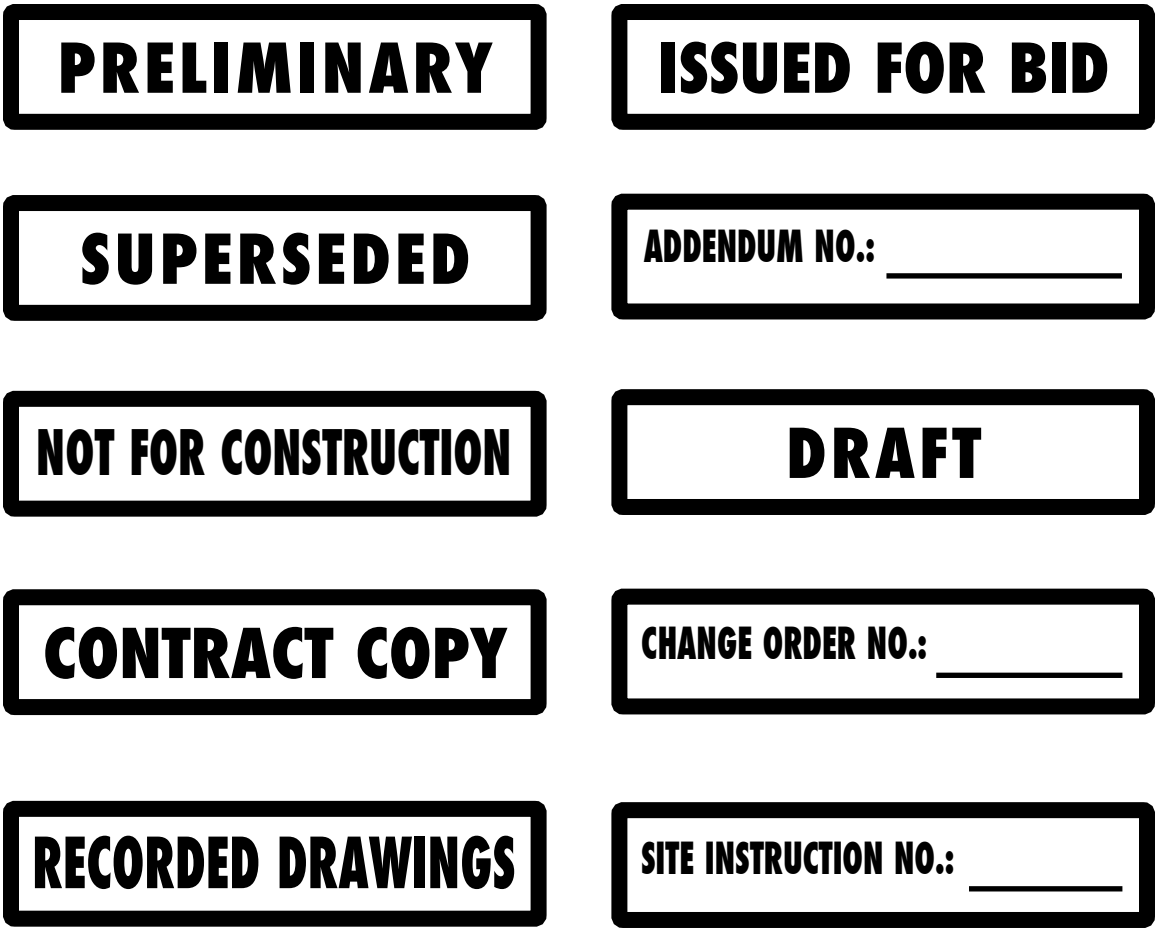
When numerous supplemental instructions are issued to clarify or interpret the contract documents, a reference list is needed to track all instructions issued.

Content
On an Index of Supplemental Instructions, provide the following information:

- project name and number;
- numbers of the Supplemental Instructions (in chronological order);
- descriptive title for each instruction;
- representative who initiated the instruction;
- date of issue of the Supplemental Instruction;
- indication of whether or not a Change Order was required.

5.2 Drawing Notations

The following common notations applied to drawings indicate the stage of development of a design or construction document. In addition, the notation indicates a restriction or clarification for the document's use.



5.3 Shop Drawing Review Letters

The review of shop drawings and the the use of the appropriate cover letter and the application of notations to the shop drawings have significant implications regarding professional liability and legal responsibility. Refer to Chapter 2.3.10, *Contract Administration — Office Functions*, for the use and application of the shop drawing cover letters and notations.

The following wording is suggested for a shop drawing stamp:

Logo or Name of Architectural Practice

Reviewed ( )
Reviewed as noted ( )

Revise and resubmit ( )
Not reviewed ( )

Date:

Reviewed by:

This review is for the sole purpose of ascertaining conformance with the general design. This review does not relieve the Contractor of the responsibility for errors or omissions in the shop drawings or of the responsibility to meet all requirements of the contract documents. The Contractor shall confirm all dimensions and coordinate all construction and the work of all sub-trades.

The following are other possibilities for cover letters:

1. For shop drawings which are not required:

This submission is not required under the contract documents and is being returned with no action taken by the Architect.

2. For shop drawings with engineering content only:

[Note: clarify in the cover letter that shop drawings have **not** *been reviewed by the architect.]*

Date Received:

File or Project No.:

Routing:

Action:

3. For shop drawings to be reviewed only by the architect:

Reviewed ( )
Reviewed as noted ( )

Revise and resubmit ( )
Not reviewed ( )

Date:

Reviewed by:

This review by *[insert name of practice]* is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that *[insert name of practice]* approves the detailed design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of the responsibility for errors or omissions in the shop drawings or of the responsibility for meeting all requirements of the contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the work of all trades.

4. For shop drawings with engineering elements which must also be reviewed by the architect:

Reviewed ( )
Reviewed as noted ( )

Revise and resubmit ( )
Not reviewed ( )

Date:

Reviewed by:

This review by *[insert name of practice]* is for the sole purpose of ascertaining conformance with the general design concept for architectural features only, and does not in any way constitute review of the design of engineering elements which form part of the contract documents prepared by others. This review shall not mean that *[insert name of practice]* approves the detailed design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of the responsibility for errors or omissions in the shop drawings or of the responsibility for meeting all requirements of the contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the work of all trades. Refer also to Form ___, a sample cover letter regarding shop drawing review.

Refer also to Form 3.1c, a sample cover letter regarding shop drawing review.

5.4 Log of Shop Drawings and Samples

It is important to ensure the timely review and tracking of all shop drawings and samples, both within the architect's office and by consultants. This log assists in the efficient management and distribution of shop drawings and samples.

Items within the log of shop drawings and samples may be listed or filed using the MasterFormat™ system. A copy of the log should be filed with the project's shop drawings.

Purpose
The shop drawings and samples log:

- provides a list of all required shop drawings and samples;
- identifies shop drawings and samples required but not yet received;
- determines the status of the review and distribution of shop drawings as well as approval of samples;
- provides a checklist for the preparation and review of a manual during "take-over."

Content
The shop drawings and samples log may contain the following:

- title of the drawing;
- drawing number;
- date of preparation;
- MasterFormat™ number for the product or system;
- company or trade responsible for preparing the drawing;
- date received;
- name of consultant to whom the drawing or sample was referred for review;
- date of referral;
- date that the shop drawing or sample is returned;
- date that the shop drawing is forwarded to the general contractor;
- status of the shop drawing or sample (e.g., reviewed, reviewed as noted, or resubmit).

Logo or Name of Architectural Practice

Memorandum

To: Project Architect
From: Job Captain
Subject: ABC Building Renovation
Mechanical Data

Date: September 5, 2009
File/Project No.: 09101

Mechanical Engineer has advised as follows:

1. Mechanical Order of Magnitude Costs

1.1	Ground floor offices	$6,600
1.2	Boardroom	$6,600
1.3	Second floor offices	$11,500
		$24,700

Note: These costs are exclusive of fees or contingencies.

2. Architectural Requirements for Mechanical

2.1 Roof-top AC ducts (3) require holes in roof, roof curbs and enclosures in vertical duct shafts (about 2'-0" x 2'-0")

2.2 Furred-in enclosure for ducts allow 20" extensions, six spots cut and patch for each unit.

3. Electrical Requirements for Mechanical

3.1 2 1/2 H.P. required for each AC unit noted above.

c. Mechanical Engineer
Electrical Engineer

Method of Transmission: by e-mail only.

Logo or Name of Architectural Practice

Minutes of Meeting No.: 4

Project: ABC Building Renovation

Date: May 18, 2009 **Project No.:** 09101

Location: Site

The following summarizes all subjects discussed and decisions reached at the above-noted meeting. Please advise Architect of any errors or omissions.

4.1 ATTENDEES

Client: U. Lysses
Contractor: O. Lympus
Architect: P. Thagorus, J. Smith

4.2 GENERAL

.1 Contract — Client is to sign contract and return to Architect at earliest convenience (outstanding 2 weeks).

.2 Insurance — Contractor is not prepared to accept $1,000 deductible as noted in his letter to provide same for remainder of project duration by June 1, 2009. Client to review.

.3 Cash Flow — Contractor has provided cash flow projections for first three months and is to provide same for remainder of project duration by June 1, 2009.

.4 Schedule — Copies of garage and tower superstructure bar chart schedules were distributed to Client and Architect for review and comment.

4.3 ARCHITECTURAL

.1 Samples — Travertine sample to be resubmitted.

.2 Hoarding Colour & Sign — Client to advise regarding hoarding colour and $600 allowance for sign.

.3 Documentation — Contractor advised that they had documented the condition of existing landscaped area by photograph and letter, before erecting temporary offices. A copy of this documentation will be submitted to Architect.

Action by

Client
U. Lysses

Client
U. Lysses

Contractor
O. Lympus

Architect
P. Thagorus

Contractor
O. Lympus

Client
U. Lysses

Contractor
O. Lympus

Action by

4.4 STRUCTURAL

.1 Service Tunnels —, Contractor stated that their bid does not include an allowance for tunnels, to connect services. Tunnel work should commence immediately, but the contractor is not prepared to start until this matter is clarified. Architect to review and advise.

Architect
P. Thagorus

.2 Garage Alterations — Existing pipe columns are to be inspected by Structural Engineer and reworked. Instructions required (outstanding 1 week).

Structural Engineer

4.5 MECHANICAL

.1 No pending business.

4.6 ELECTRICAL

.1 Electrical Contract Clarification — Decision on the following is still outstanding and is delaying finalization of prime contract and electrical sub-contract:

- ABC fixtures in lieu XYZ
- Transformer type — dry type vs. oil

Client reported that while they have been fully briefed on this situation, they will not consider the matter further until Contractor replies to the Architect's letter of 10 April 2009.

Contractor
O. Lympus

4.7 STATUS OF SHOP DRAWINGS AND SAMPLES

.1 Contractor and Architect reported no outstanding items at this time.

4.8 STATUS OF CHANGES

.1 Status Proposed Changes issued to date:

PC 1 Incoming service & power supply	Client signing CO
PC 2 Travertine finish — core walls	Architect checking
PC 3 Mechanical revisions	Architect checking
PC 4 Structural foundation revisions	Architect checking
PC 5 Clarification of parking garage structure	Contractor pricing
PC 6 Sprinkler revisions	Contractor pricing

4.9 DISTRIBUTION — U, Lysses
— O, Lympus
— Structural Engineer

Prepared by:
James Smith, Project Architect

Logo or Name of Architectural Practice

Transmittal

Project Name: **Project No.:**

Date:

To:

From:

For your:
- ❑ Approval
- ❑ Distribution
- ❑ Information and use
- ❑ Review and comment

Via:
- ❑ Mail
- ❑ Courier
- ❑ By hand
- ❑ To be picked up
- ❑ Fax
- ❑ E-mail

Quantity: **Description:**

Remarks:

Logo or Name of Architectural Practice

Project Team Directory

Name of Project:

Project No.:

Date Prepared:

Name of Client:

Name of Client's Representative:

Address:

Telephone:

Fax:

Cellular:

E-mail:

DISCIPLINE	Firm NAME	Representative
Architect		
Address		
Telephone		
Fax		
Cellular		
E-mail		
Structural Engineer		
Address		
Telephone		
Fax		
Cellular		
E-mail		
Mechanical Engineer		
Address		
Telephone		
Fax		
Cellular		
E-mail		
Electrical Engineer		
Address		
Telephone		
Fax		
Cellular		
E-mail		
Other Consultants		
Address		
Telephone		
Fax		
Cellular		
E-mail		

Logo or Name of Architectural Practice

Bid Documents Distribution List

Name of Project:

Project No.:

Name of Client:

Bid closing:

Name of Bidder or Recipient	Address/Telephone/Fax	Number of Sets	Deposit Received (include date and amount)	Deposit Returned (include date and amount)	Addenda Issued (include date)				

Form 2.1

Logo or Name of Architectural Practice

Addendum No._____

page _____ of _____

Project No.:

Date:

Project:

The following information supplements and/or supersedes the bid documents issued on _____.

This Addendum forms part of the contract documents and is to be read, interpreted, and coordinated with all other parts. The cost of all contained herein is to be included in the contract sum. The following revisions supersede the information contained in the original drawings and specifications issued for the above-named project to the extent referenced and shall become part thereof. Acknowledge receipt of this Addendum by inserting its number and date on the Tender Form. Failure to do so may subject bidder to disqualification.

Drawings:

Specifications:

Logo or Name of Architectural Practice

Summary of Bids

Name of Project: _____ **Project No.:** _____

Name of Client: _____

Bid Closing: _____

Name of Bidder	Bid Amount	Bid Security (bid bond, certified cheque, etc.)	Agreement to Bond	Informal Bid (specify irregularity)	Proposed Alternatives	Cost Savings or Extras	Proposed Completion Date

Client's logo

Letter to Client reporting on Bids

Project No.

Date:

Name:

Company:

Address:

City: **Postal Code:**

Fax:

Dear Sir or Madam :

Re: **Project Name:**

Project Name continued:

Sealed Tenders for the above work were received from (insert number) interested general contractors at (time) on (day), (date), with the following resulting Base Prices:

1.	$
2.	$
3.	$
4.	$
5.	$
6.	$
7.	$
8.	$

A copy of the (insert name of General Contractor's) tender is attached. They gave (insert number) weeks as a proposed time to have the work "Substantially Performed". Their sub trades appear satisfactory.

(General Contractor) is the low bidder. (insert number) alternative prices were requested, (#1...). The inclusion of any figure does not change the status of the low bidder. Bids were accompanied with Bid Bonds.

(Explain alternative prices)

The tenders do not include any funds for items of a contingency nature. Normally we recommend (insert number) % of the tender price for such work.

Upon your affirmation of acceptance we will advise on your behalf (insert name of General Contractor) and issue a letter indicating acceptance of their bid. This will allow the Contractor to order materials, etc. pending preparation of the contract for signature.

Yours very truly,
Person, Designations
Title

Encl.

Client's logo

Letter of Acceptance

Project No.

Date:

Person:

Company:

Address:

Address (cont.)

Dear Sir or Madam :

Re: **Tender:**

Project Name:

Tenders for the above project were received at *(time and date)*. On behalf of the client, we would like to inform you that the tender of *(contractor)* has been accepted on the basis of low bid.

We would like to confirm that the alternate price *(description as required)* be included in this contract. The contract award will be for the base contract only, at your submitted price of *(insert bid amount)*, plus GST.

Please contact the undersigned to confirm details pertaining to the site mobilization, including as any further information required, access to existing drawings, and approach to be taken. We will require the name of your site supervisor and project manager as soon as possible. We also require a start-up meeting on site to familiarize those involved with the site, as well as set up a schedule for meetings and protocols.

As discussed, you are expected to complete the project on schedule as per the specifications, with the exception *(include exception if required)*.

We look forward to a successful completion of this project.

Yours truly,

Person, Designations
Title

c. Mr. Company Fax: *if required*

Client's logo

Letter to Unsuccessful Bidders

Project No.

Date:

Person:

Company:

Address:

Address (cont.)

Dear Sir or Madam :

Re: **Tender:**

Project Name:

Tenders for the above project were received at (time and date). On behalf of the client, we regret to inform you that the tender of (contractor) has been accepted on the basis of low bid.

We thank you for the submission of your bid, and hope that we have the opportunity of working with you in the future.

Enclosed please find your bid bond and consent of surety submitted with your tender. We would appreciate the prompt return of the tender documents in your possession, for which we will return your deposit cheque(s).

Yours truly,
Person, Designations
Title

c. Mr. Company Fax: if required

Logo or Name of Architectural Practice

Field Review Report 3

Project: ABC Building Renovation
10 Jones Avenue, Toronto

Contractor: Construction Contracting Ltd.

Weather: Sunny, 5° C

Date of Visit(s): October 4, 2009

Project No.: 08101

Building Permit No.: 174/09

GENERAL

1.1 Reviewed work in progress with Client.

WORK IN PROGRESS — OBSERVATIONS

2.1 Demolition of existing building complete. Sub-contractor to remove stockpiled materials at N.W. corner of site.

2.2 Site preparation — Topsoil removed and stockpiled on site. Existing paved surfaces removed. Rough grading complete. Equipment on site — one tractor, vibrator, and compactor.

2.3 Excavation for footings complete — see Structural Engineer's report.

2.4 Footings — Concrete footings poured along gridline A from grids 1 to 8. Forming footings for remainder of gridline A. Four workers plus superintendent. Reinforcing steel for footings delivered.

INFORMATION OR ACTION REQUIRED

3.1 Sketches made of existing 100 x 100 steel column at grid E3 to E9. Contractor to clear away miscellaneous wood to expose connection in order to verify shop drawing details of steel connection to existing.

ITEMS TO BE VERIFIED — None.

Report by: James Smith Title: Project Architect

_____(Project Architect)
(signature)

Distribution by fax: ABC Corporation — Client Representative
Construction Contracting Limited, Project Manager
Chief Building Official
Architect File

Attachments: Structural Engineer Field Review Report Number 3

Method of transmission:

Logo or Name of Practice

Summary of Changes

Project Name: _____ **Project No.:** _____

Proposed Change / Change Directive										Change Order						Remarks
No.	Description	Action								No.	Issued	Price Change ($)	Charge to Allowance	Time Change		
		Issued	Quote	Forward to Consultant				Return for Revision						Days	Cumulative Total	
				Issued	Discipline	Deadline	Rec'd	Issued	Deadline							
19.	Extra excavation	Aug. 21	15/09	16/09	S	23/09	25/09	27/09	10/10	19.						site conditions
	authorized by Change	Rev. 1	15/10	16/10	S	23/10	22/10	23/10	06/11							
	Directive	Rev. 2	12/11	12/11	S	15/11	14/11				17/11	11,500	Y	+3		
20.	Add Humidification to	03/09	27/09	28/09	M	02/10	03/10	04/10	11/10	20.						Owner's request
	staff room	Rev. 1	11/10	12/10	M	15/10	14/10				15/10	5,000	N	0		

Form 3.7

Logo or Name of Practice

Request for Information
RFI No._____

To:

From:

Project:

Issue Date:

Project no.

Requested Reply Date:

Copies to:

Description of Request:
(fully describe the question or type of information requested)

References / Attachments:
(List specific documents researched when seeking information requested, including specifications and drawings)

Recommendation or Direction to Contractor:
(if RFI concerns a site or construction condition, the sender may provide a recommended solution)

Reply:
(Provide answer to RFI, including cost and/or schedule considerations)

Response contained in contract documents ❑ **yes** ❑ **no**

By: _____ **Date:** _____

This form is based in part on AIA Document G716 -2004, reproduced with permission of the American institute of Architects (AIA).

SHOP DRAWING REVIEW

Date: November 12, 2008

File: 08301 4.6

Re: **Office and Courtroom Renovations for Accessibility**

Project ID: B0235A-0078 Contract ID: 016144

To: ACME Construction

Attention: John Doe,

Returning pdfs of lift shop drawings for Garaventa Stair Lift Xpress II prepared by West Elevators and Lifts and submitted by ACME Construction in an email on September 25, 2008.

Pages: transmittal+ 2 attachments as follows:

.1 1163- DMA
.2 1163- FMA

Note PCN 001 has been prepared since the submission of this shop drawing to resize the platform to suit site conditions. Please edit for the O&M Manuals.

- ❑ NO EXCEPTION TAKEN
- ❑ REJECTED
- ❑ SUBMIT SPECIFIED ITEM
- ■ MAKE CORRECTIONS NOTED **
- ❑ REVISE AND RESUBMIT

Checking is only for general conformance with the design concept of the project and general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his or her work with that of all other trades; and the satisfactory performance of his or her work.

Mary LeBlanc, Architect, FRAIC

SHOP DRAWING REVIEW

Date: November 12, 2008

File: 08301 4.6

Re: **Office and Courtroom Renovations for Accessibility**

Project ID: B0235A-0078 Contract ID: 016144

To: ACME Construction

Attention: John Doe,

Returning pdfs of lift shop drawings for Garaventa Stair Lift Xpress II prepared by West Elevators and Lifts and submitted by ACME Construction in an email on September 25, 2008.

Pages: transmittal+ 2 attachments as follows:

.1 1163- DMA
.2 1163- FMA

Note PCN 001 has been prepared since the submission of this shop drawing to resize the platform to suit site conditions. Please edit for the O&M Manuals.

- ❑ NO EXCEPTION TAKEN
- ❑ REJECTED
- ❑ SUBMIT SPECIFIED ITEM
- ■ MAKE CORRECTIONS NOTED **
- ❑ REVISE AND RESUBMIT

Checking is only for general conformance with the design concept of the project and general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his or her work with that of all other trades; and the satisfactory performance of his or her work.

Mary LeBlanc, Architect, FRAIC

SHOP DRAWING REVIEW

Date: November 18, 2008

File: 08301 4.6

Re: **Office and Courtroom Renovations for Accessibility**

Project ID: B0235A-0078 Contract ID: 016144

To: ACME Construction

Attention: John Doe,

Returning pdfs of shop drawings for Power Door Operators as prepared by Magic Entrance Systems Ltd. and submitted by ACME Construction on November 7, 2008.

Pages: This Review Sheet + 7 pages.

*** Note PCN 005 has been prepared since the submission of this shop drawing to:
a) Coordinate the location of the operators,
b) Provide a key switch in lieu of a push button to access the office from the corridor.
c) Include remote to electro magnetic lock as well as the power door operator.
d) Remote location of office door control to above washroom ceiling.
e) Please edit for the O&M Manuals.

❑ NO EXCEPTION TAKEN
❑ REJECTED
❑ SUBMIT SPECIFIED ITEM
■ MAKE CORRECTIONS NOTED **
❑ REVISE AND RESUBMIT

Checking is only for general conformance with the design concept of the project and general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his or her work with that of all other trades; and the satisfactory performance of his or her work.

.1 Finish – Anodized to match colour of frames (typical).
.2 Sheet 1 of 5 – Coordinate with glass transom. Do not obstruct glass.
.3 Switch Locations – Courtroom – as submitted. Office as per PCN 005 to be issued.

Mary LeBlanc, Architect, FRAIC

Logo or Name of Architectural Practice

Shop Drawing Review

Project: **No:**

Shop Drawing Type: **Date:**

Number of Pages Including this Shop Drawing Review Form:

Reviewed only as to general conformity with the design concept. The Architect does not warrant or represent that the information contained on this drawing is either accurate or complete. Sole responsibility for correct design, details and dimensions shall remain with the party submitting the drawing. Nothing herein reduces or removes specified requirements, unless specifically acknowledged by _____, in writing.

( ) REVIEWED ( ) REVIEWED AS MODIFIED ( ) REVISE & RE-SUBMIT ( ) NOT REVIEWED BY: ____

DISTRIBUTION: _____ **Copy**

_____ **Copies Contractor**

_____ **Copies Other**

COMMENTS:

1. CONFIRM ALL ELECTRICAL POWER CHARACTERISTICS WITH ELECTRICAL CONTRACTOR.
   (Include this if a mechanical shop drawing.)

2.

Project Number:

- ❑ Reviewed
- ❑ As Noted
- ❑ Revise and Resubmit

By:_____

Date:_____

Per General Conditions of the contract. Review is for conformity of design concept and general arrangement. Contractor is not relieved of responsibility for error or omissions, and shall meet all requirements of the contract.

Logo or Name of Architectural Practice

Log of Shop Drawings and Samples

Name of Project: _____ Project no.:_____

Review Legend

1. Not reviewed, not requested
2. Reviewed, do not resubmit
3. Reviewed with comments, do not resubmit
4. Rejected, resubmit

No.	Description of Shop Drawing or Sample	First Submission Dates								Second Submission Dates							
		Contractor to Architect **received**	Architect to Engineer **sent**	Engineer to Architect **received**	Architect to Contractor **sent**	Review Status				Contractor to Architect **received**	Architect to Engineer **sent**	Engineer to Architect **received**	Architect to Contractor **sent**	Review Status			
						1	2	3	4					1	2	3	4

Note: Provide additional columns if three or more submissions are required.

Canadian Handbook of Practice for Architects



Volume 3

Other Resources

3.1 Standard Documents of the Architectural Profession
3.2 Selected Standard Documents of the Canadian Construction Industry
3.3 Provincial Lien Legislation
3.4 Provincial Practice Bulletins or Practice Notes
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Canadian Handbook of Practice for Architects

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3.1.2 Canadian Standard Form of Agreement Between Client and Architect: *Document Six*

3.1.3 Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: *Document Seven*

3.1.4 Canadian Standard Form of Agreement Between Architect and Consultant: *Document Nine*

3.2 Selected Standard Documents of the Canadian Construction Industry

3.2.1 Stipulated Price Contract — CCDC 2

3.2.2 Cost Plus Contract — CCDC 3

3.2.3 Statutory Declaration Forms — CCDC 9A, 9B, 9C

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3.2.6 Project Financial Information — CCDC 12

3.2.7 Design-Build Stipulated Price Contract — CCA — CSC — RAIC *Document 14*

3.2.8 A Guide to the Use of CCDC 2 — 1994 — CCDC 20

3.2.9 A Guide to Construction Surety Bonds — CCDC 22

3.2.10 A Guide to Calling Bids and Awarding Contracts — CCDC 23

3.2.11 A Guide to Model Forms and Support Documents — CCDC 24 *(c/w computer disk)*

3.2.12 Rules for Mediation and Arbitration of Construction Disputes — CCDC 40

3.2.13 A Guide to the Use of CCDC 3 — CCDC 43

3.3 Provincial Lien Legislation

3.4 Provincial Practice Bulletins or Practice Notes

3.5 RAIC Practice Builders

3.5.1 List: RAIC Practice Builders

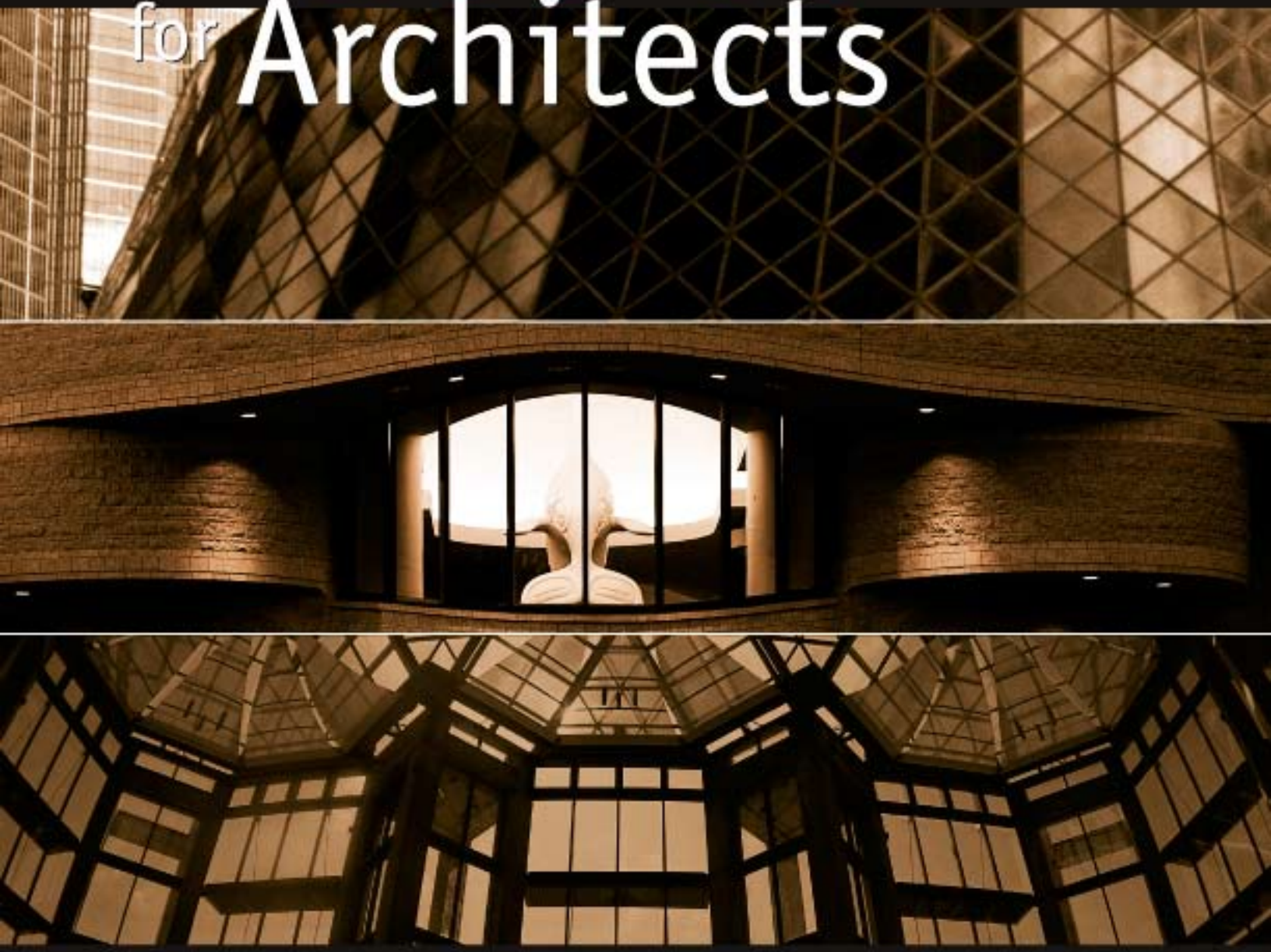
List: RAIC Practice Builders

- Building with Media
- Building Information Modelling (BIM)
- Construction and Demolition Waste Management Specifications
- Tips to Get Your Finances in Shape
- 60 Winning Proposal and Professional Tips
- 75 Tips to Keep Clients
- An Intense Look At Decision Makers
- Building Credibility and Confidence
- Firm Valuation
- Guide to Using Consultants
- ISO 9000 and Your Practice
- Networking to Build Your Practice
- Ownership Transition
- Project Management - Keys to Leadership
- Setting Your Yardstick for Growth and A Vision to Pursue
- Strategic Planning = Market Share
- Tips for Successful Marketing
- Tips to Avoid Fee Bidding

3.6 Other References

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Canadian Handbook of Practice for Architects



SECOND EDITION

The Canadian Handbook of Practice for Architects
Second Edition 2009

This Handbook has been developed based on the First Edition of 1999, its four subsequent supplements, and through the review and input of an Editorial Board comprised architects from each region of Canada.

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Disclaimer
Neither the Royal Architectural Institute of Canada nor the Editorial Board, nor the Editors take responsibility for the accuracy or completeness of any information or its fitness for any particular purpose. The Handbook describes procedures for general practice only and is neither exhaustive nor complete. Based on specific facts or circumstances, the application of these procedures may vary, such as variances from province to province. The Handbook outlines recommended practices; however, these recommendations are not to be interpreted as a standard of practice or a standard of care in the provision of professional services.

Canadian Handbook of Practice for Architects

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3.5 RAIC Practice Builders
- 3.5.1 List: RAIC Practice Builders *(Practice Builders to be downloaded and inserted by practitioner)*

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(to be inserted by practitioner)

Introduction

The practice of architecture requires a wide range of professional skills. These include: the knowledge and skill to design buildings; a thorough understanding of sound and durable building science and construction; construction economics; proficiency in the application of business and legal principles; and the ability to motivate, coordinate, and manage a complex group of participants. The architect should be a be designer, construction expert, and manager. It is hoped that this Second Edition of the *Canadian Handbook of Practice for Architects* will contribute to improving the practice of architecture and, consequently, help to improve the built environment and architecture in Canada.

The *Canadian Handbook of Practice for Architects* is the result of a great collaborative effort by the architectural profession from every region of the country. This Second Edition of 2009 has been developed and published in both official languages.

Objectives of the Canadian Handbook of Practice

The Handbook is mainly intended for practising architects and those who plan on becoming architects; and in addition, it is also meant for non-architects who want to better understand the profession. With these users in mind, the Handbook's objectives are to:

- provide an instructional resource book for architectural students, intern architects and others;
- establish a reference document to assist architects in Canada by providing concise and current information.

The Handbook includes information and advice, in the form of summaries, lists, checklists, charts, and sample documents, as well as sources of additional reference material.

History

In March of 1974, the Ontario Association of Architects (OAA) initiated the production of a *Canadian Handbook of Practice for Architects*, specifically tailored to Canadian architectural practice. J. Hugh Westren, the Editor of the first edition, was commissioned in June 1974 to start work on a Handbook of national scope. The first edition was published in 1976. In the early 1990s, some revisions were made to a few sections of the Handbook. Many of these revisions were reprinted from information provided by The American Institute of Architects.

In January of 1997, the National Practice Program — an alliance of the ten provincial associations of architects and the Royal Architectural Institute of Canada — appointed a national Editorial Board to direct the creation of a new, updated edition of the *Canadian Handbook of Practice for Architects*. The National Practice Program approved a business plan for this venture in June of 1998 with the development costs being underwritten by every provincial association of architects. Editors were appointed, and the writing and editing of this new edition commenced in the fall of 1998.

In April 2004 the provincial associations of architects assigned the copyright for the *Canadian Handbook of Practice for Architects* and other contract documents for the architecture profession to the RAIC. In the spring of 2008, the RAIC Board of Directors appointed a new Editorial Board to direct the updating of the Second Edition of the *Canadian Handbook of Practice for Architects*. This edition incorporates all of the four supplements issued since the 1999 edition and updates the references. Also, new information is incorporated and advice has been revised to meet current standards of practice. This Second Edition, primarily distributed in electronic format, was published in the spring of 2009.

Format

Volume 1 Theory and Background

Volume 1 is an overview of the architectural profession and architectural practice. The 11 chapters in this section provide theory and background information to the architectural profession and an introduction to the business and professional environment in which an architect works.

Volume 2 Management

Volume 2 is divided into two sections: *Management of the Practice* and *Management of the Project*. Each of the 22 chapters contains instructional and descriptive information as well as checklists and some sample forms for the practitioner to use and modify. Additional forms are provided in CCDC 24: *A Guide to Model Forms and Support Documents* which should be obtained and inserted in Volume 3.

Volume 3 Other Resources

Volume 3 is a binder for architects to file standard documents used by the profession and the construction industry in Canada. For reference purposes, the user should obtain and insert all relevant documents.

In addition, tabs have been provided to permit users to insert information supplied by the provincial or territorial associations of architects and the Royal Architectural Institute of Canada, as well as other relevant reference material.

Improving the Handbook

Our profession and society as a whole are experiencing a rapid rate of change; as a result, the Handbook will require constant revision and improvement.

Your suggestions about information which should be added, or existing material which should be revised, are welcome. Suggestions and comments should be addressed to:

The Royal Architectural Institute of Canada
55 Murray Street, Suite 330
Ottawa, Ontario K1N 5M3

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Thank You's

In my introduction to the first edition I thanked the many writers and editors involved in creating such an important document to assist the architecture profession in Canada. It is very important to thank them once again as their work was the foundation for this Second Edition. The updates and revisions for this Second Edition were directed by a new Editorial Board comprised of D. Gregg Brown, FRAIC, MAIBC; Cathy Capes, MRAIC, OAA; Pierre Corriveau, MIRAC, OAQ; Louis Lessard, MIRAC, OAQ; Rick Linley, FRAIC, MAA; Robert J. Ojolick, MRAIC, NSAA and Barbara Shipman, FRAIC, AAA. I must thank them for the long meetings in Ottawa and for the time they spent in reviewing great volumes of text at short notice. Once again it has been an honour to work with such a great team.

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Canadian Handbook of Practice for Architects



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Building: Columbus Center of Marine Research and Exploration
Photographer: Michael Dersin

List of Acronyms used in the Design and Construction Industry

Acronym	Name
AA	Aluminum Association
AAA	The Alberta Association of Architects
AAMA	American Architectural Manufacturers Association
AANB	Architects' Association of New Brunswick
AAPEI	Architects Association of Prince Edward Island
AAPPQ	Association des Architectes en Pratique Privée du Québec
ABET	Accrediting Board for Engineering and Technology
ACE	Architects' Council of Europe
ACEC	Association of Canadian Engineering Companies
ACEQ	Association of Consulting Engineers of Quebec
ACI	American Concrete Institute
ACPA	American Concrete Pavement Association
ACPA	American Concrete Pipe Association
ACSA	Associate of Collegiate Schools of Architecture
ADR	Alternative Dispute Resolution
AECB	Atomic Energy Control Board
AFP	Alternative Funding Plan
AGC	Associated General Contractors of America
AGMCA	Architectural Glass and Metal Contractors Association
AHA	American Hardboard Association
AHRI	Air Conditioning and Refrigeration Institute
AI	Asbestos Institute
AIA	American Institute of Architects
AIAS	American Institute of Architecture Students
AIBC	Architectural Institute of British Columbia
AITC	American Institute of Timber Construction
AMA	Architectural Metals Association
AMCA	Air Movement and Control Association Inc.
ANSI	American National Standards Institute
APA	American Plywood Association

Acronym	Name
APEC	Asia-Pacific Economic Cooperation
API	American Petroleum Institute
APPA	The Association of Higher Education Facilities Officers
APR	Architectural Program Report
ARB	Architects Registration Board (UK)
ARE	Architect Registration Examination
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASINEA	Asociacion de Instituciones de Ensenanza de la Arquitectura
ASME	American Society of Mechanical Engineers
ASPT	Association of Asphalt Paving Technologists
ASTM	American Society for Testing and Materials
AWCI	Association of Wall and Ceiling Industries International
AWI	Architectural Woodworking Institute
AWMAC	Architectural Woodwork Manufacturers Association of Canada
AWPA	American Wire Producers Association
AWS	American Welding Society
AWWA	American Water Works Association
BEEP	Building Envelope Education Program
BREEAM	BRE Environmental Assessment Method
BIA	Brick Industry Association
BIM	Building Information Modeling
BNQ	Bureau de normalisation du Québec
BOMA	Building Owners and Managers Association
BOT	Build-Own-Transfer
BOOT	Build-Own-Operate-Transfer
DBOOT	Design-Build-Own-Operate-Transfer
BSI	Building Stone Institute
CAA	Commonwealth Association of Architects
CABA	Continental Automated Building Association
CACB	Canadian Architectural Certification Board
CAD	Computer-Aided Design or Computer-Aided Drawing
CAEAL	Canadian Association for Environmental Analytical Laboratories Inc.
CAGBC	Canada Green Building Council
CALA	Canadian Architectural Licensing Authorities

Acronym	Name
CASA	Canadian Architecture Students Association
CASA	Canadian Alarm and Security Association
CBAC	Clay Brick Association of Canada
CCA	Canadian Cement Association
CCAC	Committee of Canadian Architectural Councils
CCBDA	Canadian Copper and Brass Development Association
CCBFC	Canadian Commission on Building and Fire Codes
CCCA	Certified Construction Contract Administration
CCDC	Canadian Construction Documents Committee
CCI	Canadian Carpet Institute
CCUSA	Canadian Council of University Schools of Architecture
CECA	Canadian Electrical Contractors Association
CGA	Canadian Gas Association
CGL	Commercial General Liability
CGSB	Canadian General Standards Board
CHBA	Canadian Home Builders' Association
CHOP	Canadian Handbook of Practice for Architects
CICC	Construction Industry Consultative Committee
CIQS	Canadian Institute of Quantity Surveyors
CISC	Canadian Institute of Steel Construction
CITC	Canadian Institute of Timber Construction
CLA	Canadian Lumbermen's Association
CLAS	Calibration Laboratory Assessment Service/NRC
CLSAB	Canadian Lumber Standards Accreditation Board
CMCA	Canadian Masonry Contractors Association
CMHC	Canada Mortgage and Housing Corporation
CNSC	Canadian Nuclear Safety Commission
COFI	Council of Forest Industries
CPCA	Canadian Paint and Coatings Association
CPCA	Canadian Portland Cement Association
CPCI	Canadian Precast/Prestressed Concrete Institute
CPI	Canadian Plastics Institute
CPIA	Canadian Plastics Industry Association
CPM	Critical Path Method
CPMA	Canadian Paint Manufacturers Association

Acronym	Name
CPP	Canada Pension Plan
CRCA	Canadian Roofing Contractors' Association
CRSI	Concrete Reinforcing Steel Institute
CSA	Canadian Standards Association
CSC	Construction Specifications Canada
CSDFMA	Canadian Steel Door and Frame Manufacturing Association
CSI	Construction Specifications Institute
CSLA	Canadian Society of Landscape Architects
CSSBI	Canadian Sheet Steel Building Institute
CTCA	Ceramic Tile Contractors Association
CTR	Certified Technical Representative
CWB	Canadian Welding Bureau
CWC	Canadian Wood Council
CWDMA	Canadian Window and Door Manufacturing Association
DBFM	Design Build Finance Maintain
DCC	Defence Construction Canada
DND	Department of National Defence
EEMAC	Electrical Equipment Manufacturers Association of Canada
EFC	Electro-Federation Canada
EI	Employment Insurance
EIMA	EIFS Industry Manufacturer's Association
EPA	Environmental Protection Agency
EXAC	Examination for Architects in Canada
FBHRO	Federal Building Heritage Review Office
FCARM	La Federacion Nacional de Colegios de Arquitectos de la Republica Mexicana
FCC	Forintek Canada Corporation
FGMA	Flat Glass Manufacturers Association
FIDIC	International Federation of Consulting Engineers
FMEC	Factory Mutual Engineering Corporation
FPAA	Federacion Panamericana de Asociaciones de Arquitectos
FPS	Forest Product Society
GANA	Glass Association of North America
GST	Goods and Services Tax
HVAC	Heating, Ventilation and Air Conditioning
HI	Hardwood Institute

Acronym	Name
HRAI	Heating, Refrigerating and Air Conditioning Institute of Canada
HST	Harmonized Sales Tax
IAP	Intern Architect Program
ICBO	International Conference of Building Officials
ICOGRADA	International Council of Graphic Design Associations
ICOMOS	International Council on Monuments and Sites
ICSID	International Council of Societies of Industrial Design
IDC	Interior Designers of Canada
IDP	Intern Development Program
IPT	Integrated Project Team
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IFI	International Federation of Interior Design
IFMA	The International Facility Managers Association
INTA	International Development Association
IRC	Institute for Research in Construction
ISO	International Organization for Standardization
ISOCARP	International Society of City and Regional Planners
ITS	Intertek Testing Services
JIA	Japan Institute of Architects
KPMG	KPMG Quality Registrar Inc.
LCA	Life Cycle Assessment
LCC	Life Cycle Costing
LEED	Leadership in Energy and Environmental Design
LSGA	Laminators Safety Glass Association
MAA	Manitoba Association of Architects
MCAC	Mechanical Contractors Association of Canada
MNECB	Model National Energy Code for Buildings
MSS	Manufacturers' Standardization Society of Valve and Fittings Industry
NLAA	Newfoundland and Labrador Association of Architects
NAAB	National Architectural Accrediting Board, Inc.
NAAMM	National Association of Architectural Metal Manufacturers
NAFTA	North American Free Trade Agreement
NBC	National Building Code
NCARB	National Council of Architectural Registration Boards (US)

Acronym	Name
NCMA	National Concrete Masonry Association
NEMA	National Electrical Manufacturers Association
NFCA	National Floor Covering Association
NFPA	National Fire Protection Agency
NGA	National Glass Association
NHLA	National Hardwood Lumber Association
NIST	National Institute of Standards and Technology
NLGA	National Lumber Grades Authority
NMS	National Master Specification
NPCA	National Precast Concrete Association
NRC	National Research Council
NRCan	Natural Resources Canada
NSAA	Nova Scotia Association of Architects
NWTAA	Northwest Territories Association of Architects
OAA	Ontario Association of Architects
OAQ	Ordre des architectes du Québec
OGCA	Ontario General Contractors' Association
P3	Public Private Partnership
PCI	Precast/Prestressed Concrete Institute
PERT	Program Evaluation and Review Technique
PMI	Project Management Institute
PST	Provincial Sales Tax
PWGSC	Public Works and Government Services Canada
QMI	Quality Management Institute, a division of CSA
QPP	Quebec Pension Plan
QS	Quantity Surveyor
QUASAR	Quality Systems Assessment Registrar
RAIA	Royal Australian Institute of Architects, now the Australian Institute of Architects
RAIC	Royal Architectural Institute of Canada
RFPs	Request for Proposals
RIBA	Royal Institute of British Architects
SAA	Saskatchewan Association of Architects
SBCCI	Southern Building Code Congress International
SCC	Standards Council of Canada
SGS	SGS International Certification Services Canada Inc.

Acronym	Name
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association
TCAA	Tile Contractors Association of America
TIAC	Thermal Insulation Association of Canada
TPIC	Truss Plate Institute of Canada
TQM	Total Quality Management
TTMAC	Terrazzo, Tile and Marble Association of Canada
UDS	Uniform Drawing System
UIA	Union internationale des architectes
UL	Underwriters Laboratories (US)
ULC	Underwriter's Laboratories of Canada
UNCHS	United Nations Centre for Human Settlements
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
WACCA	Walls and Ceilings Contractors Association
WCLIB	West Coast Lumber Inspection Bureau
WDMA	Windows and Door Manufacturers Association
WHMIS	Workplace Hazardous Materials Information System
WHPS	Warnock Hersey Professional Services
WIP	Work-in-Progress
WWPA	Western Wood Products Association

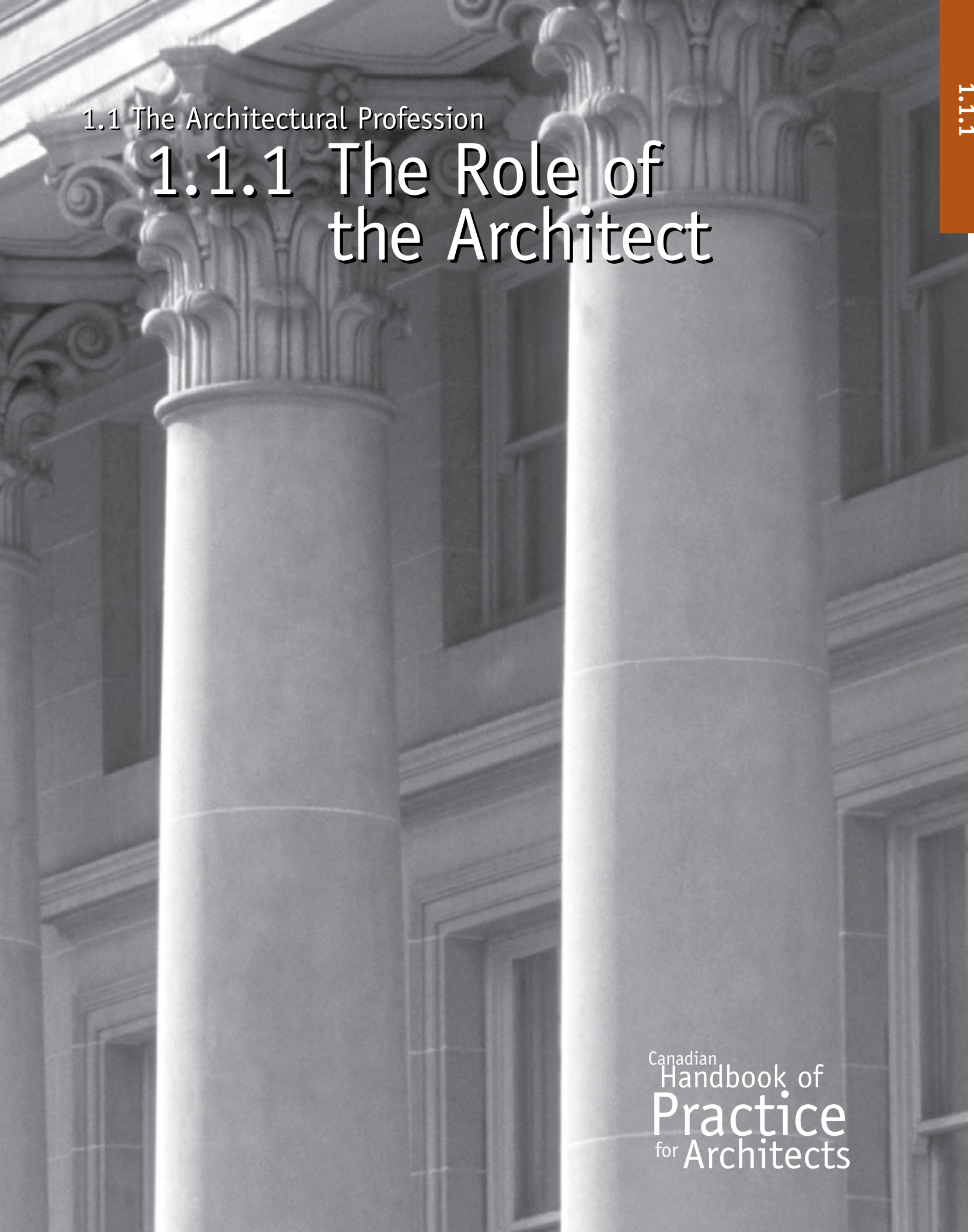
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1.1 The Architectural Profession

1.1.1 The Role of the Architect



1.1.1

The Architect in Society
- Challenges and Opportunities for Architects in the 21st Century
- Sustainable Design
- New Forms of Project Delivery
- New Technologies and Tools for Practice
- Globalization
- The Architect as an Integrator
- Professional Responsibility

Architects in Private Practice

Corporate Architects (Private Sector)

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- Federal
- Provincial/Territorial
- Municipal

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Architects in Construction and Development

Other Roles for Architects

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The Role of the Architect

The Architect in Society

Challenges and Opportunities for Architects in the 21st Century

Architecture is an evolving and dynamic profession. The role of the architect has evolved over the centuries. Architects have been:

- powerful confidants to the pharaohs in ancient Egypt;
- philosophers/planners in ancient Greece and Rome;
- artisans and craftsmen in medieval times;
- "master builders" throughout the Renaissance.

Today, the architect is usually a professional service provider. Technological and sociological changes have altered both the way architecture is practised as well as the role of the architect in society. Architecture remains an exciting profession and architects continue to shape our built-environment and contribute to society and the planet.

There are several new frontiers in architectural practice which provide exciting opportunities for architects, including:

- sustainable design;
- new forms of project delivery;
- new technologies and tools for architectural practice; and,
- globalization.

Sustainable Design

The ever-increasing consumption of water, raw materials, fossil fuels together with the need to reduce demand for non-renewable resources will impact the future role of the architect and architectural practice.

Architects in Canada are currently leaders in both research and the design of sustainable buildings. In 2002, the Sustainable Buildings Canada Committee of the RAIC was transformed into the Canada Green Building Council and the RAIC provided administrative and financial support for this new organization whose goal is to transform the design and construction market. Today many architects continue to lead and contribute to the work of the Canada Green Building Council and to advancements in sustainable design.

New Forms of Project Delivery

Clients and governments are constantly seeking new ways of financing and more efficient methods to design and construct buildings and infrastructure projects. This has resulted in new and evolving methods of project delivery. Consequently, the architect's professional relationship with clients, users and others in the construction industry is changing. Project delivery methods such as Design-Build and Public Private Partnerships (also known as P3) mean that the architect is often engaged by a builder or a financial entity and not by the owner or users of the building. This presents challenges for the practice of architecture but it also offers opportunities including new roles such as a compliance Architect, advocate Architect, and the possibility of various leadership roles within these new forms of project delivery.

Refer also to Chapter 2.3.2, *Types of Construction Project Delivery*.

New Technologies and Tools for Practice

Computer software and tools used in architectural practice continue to advance and improve. The historical role of the architect to gather information, process and synthesize this information, and use presentation techniques to communicate a solution can benefit significantly from new software and computer tools. There are

opportunities for the architect to expand and develop an architectural practice depending on his or her ability to embrace and integrate these new technologies. As these tools evolve, the potential for architects to prepare more accurate cost estimates and three-dimensional images increases. Furthermore, there are many modeling and simulation software programs available to assist architects in the analysis and evaluation of energy, lighting, daylighting and other factors influencing architectural design. Some architects specialize in the applications of such software. These tools can also facilitate the integrated design process and coordination with engineers, consultants, manufacturers and construction partners. Around the start of the 21st century architects led the way in adopting Building Information Modeling.

Globalization

Architectural practice now extends to all continents and there are many multinational architectural firms established in several countries. This globalization presents new challenges to architects to adapt to different cultures and new markets abroad, as well as coping with competition in the Canadian market from international firms.

The Architect as an Integrator and Generalist

Today, an architect is a professional with a general knowledge of the many disciplines involved in the design, construction, maintenance, and alteration of buildings. An architect must also have the skills necessary to synthesize, integrate and coordinate various parts of a project into a composite whole not only to satisfy functional requirements, but also to contribute to an orderly, visually-pleasing, and sustainable environment. The individual architect may become an expert in particular aspects of design, production or management, or become an expert in a specific building type or undertake non-traditional activities such as teaching, managing or building. There is a growing trend to specialize, such as architects as code consultants or programmers, and to become accredited or certified in specialties such as building envelope consultants (in British Columbia). However, the architect maintains a *general* expertise in all aspects of the profession.

The practice of architecture is interrelated with many other design disciplines, from various types of engineering to landscape design, to sociological and planning studies. In the complex task of coordinating the many specialists involved in a project, the architect develops a unique role and set of skills. Most architects have joined the profession because of a desire to improve the environment in which people live and work. This holistic view of the built environment has enabled architects to undertake a variety of strategic roles in society.

Professional Responsibility

The architect's responsibility extends beyond the client to fellow professionals, the profession, and society in general. The amount of responsibility an architect is prepared to accept will determine how he or she practises architecture. The employed or salaried architect has reduced direct responsibility to his employer's client, whereas the sole practitioner carries the entire responsibility. Architects in partnership share this responsibility. The architect's responsibility varies depending on the architect's role in society. Refer also to Chapter 1.1.3, *ProfessionalConduct and Ethics*, for more information on professional obligations and responsibilities.

Architects in Private Practice

The general public traditionally views the architect as a private practitioner.

> *Architectural Practice is the setting where ethos and circumstances lock horns, where individual and professional goals combine with budgets, deadlines, skills, organization, power, context and regulations.*
> (Cuff)

Architects in private practice may be:

- self-employed;
- employed (salaried) architects working for other professionals;
- independent contractors providing services to other architects;
- specialist consultants in various fields, such as project management, building codes, conservation, and specifications.

Self-employed architects may be:

- sole proprietors;
- in partnership with other architects or engineers;
- directors or shareholders of an architectural corporation.

Self-employed architects in private practice must maintain expertise in two distinct areas:

- the performance of architectural services;
- the operation and management of a practice, including staff.

Refer also to Chapter 2.1.1, *Organization of an Architectural Practice*. The architect in private practice accepts liability for the architectural commissions which the architect undertakes.

Refer also to Chapter 2.1.7, *Human Resources*, for a discussion of employees and independent contractors in the design professions.

Corporate Architects (Private Sector)

Many corporations — that do not practise architecture — employ architects as members of their staff. For example, many large corporations employ architects in their real estate, design, construction, and facilities management divisions. The architect working for a corporation must nevertheless comply with the provincial requirements for practice and the use of the professional seal. Some of these architects may provide a full range of professional services for their employer, the corporation. Alternatively, they may simply manage the design and construction by selecting architects and consultants, and by coordinating the provision of architectural services as a representative of the corporation.

Frequently, corporate architects provide services in:

- site selection;
- project planning;
- programming;
- consultant selection;
- contract negotiations;
- construction contract administration;
- facilities management.

The special skills of the architect who is committed to an organization's culture and goals can result in promotion to the executive levels of an organization.

Architects in Government and Institutions (Public Sector)

The architect can also serve society as a public service worker, that is, as an employee of the government, either at the federal, provincial/territorial or municipal level or for a public institution. Public Sector employees are not personally liable for their professional work to the same extent as their private-sector counterparts.

Often, universities and hospitals require in-house expertise for the management and expansion of their buildings and physical plant. Architects in government and institutions can exert influence and develop policies related to the built environment. Opportunities within the public sector may include positions at a technical, managerial or policy level. All levels of government construct and fund building projects as well as regulate the built environment.

Architects can play a variety of roles within government as noted below. Architects in these roles must be tactful and diplomatic in order to facilitate communication with the general public, officials, other architects, developers, and contractors.

Because many decisions regarding the built environment are made in the political arena, some architects choose to run for office for:

- various levels of government;
- school boards;
- professional or business associations.

Architects employed in government and institutions are not always required to maintain "professional" registration with a provincial or territorial association of architects. The lapse, or absence, of a professional licence can create a distance between the government "professional" and fellow architects, and can lead to a lack of currency and knowledge of the profession. Governments and the profession are working to redress this situation.

Federal

At the federal level, architects work as:

- employees of Public Works and Government Services Canada (PWGSC), Department of National Defence (DND), Defence Construction Canada (DCC), and several other federal government departments;
- conservation architects within the Federal Building Heritage Review Office (FBHRO) and Parks Canada, the guardians of national historic sites;
- researchers within federal government agencies such as the Canada Mortgage and Housing Corporation (CMHC) and the Institute for Research in Construction (IRC) of the National Research Council (NRC);
- technical representatives and policy developers or other officials related to the built environment and building codes.

Provincial/Territorial

At the provincial/territorial level, architects work as:

- employees of various provincial/territorial government ministries, crown corporations, and agencies related to the built environment (for example, education, public works and government services, housing, planning, tourism, health, building codes and regulations, and heritage);
- researchers and technicians;
- policy developers for the provincial/territorial government.

Municipal

At the municipal level, architects work as:

- building inspectors and plans examiners;
- administrators and designers within municipal departments of Planning and Development, specializing in areas such as land-use planning and zoning, urban design, heritage conservation.

Architects in Education and Research

Architects may pursue a career in academia as faculty members at the university schools of architecture or as researchers in a variety of settings. The university schools of architecture in Canada have faculty on a fulltime, visiting or adjunct (part-time) basis. (Refer to "List: Canadian University Schools of Architecture with Accredited Programs," in Chapter 1.1.4, *Admission to the Profession*.)

Some architects who teach also practise the profession or undertake research. Many architects also teach at the various community colleges, technical institutions, and cégeps ("collèges d'enseignement général et professionnelles" in Québec) which train architectural technicians, technologists, and other students who study design and the construction industry.

Architects may be involved in both pure and applied research. Opportunities exist in various government agencies, universities, manufacturers of building products, and with certain specialized institutes of research.

Architects in Construction and Development

Increasingly, architects are selecting careers directly in the construction industry or real estate development. As designers, planners, and managers, they can contribute significant skills to this sector of the economy. Typical careers include:

- developer;
- construction manager;
- contractor;
- Design-Builder;
- real estate agent.

Many developers have their own in-house staff to plan and coordinate the provision of design services for projects, and many building contractors are involved in "Design-Build" work, employing architects directly. The following skill sets can be especially marketable to builders and developers:

- marketing;
- economic feasibility studies;
- conceptual problem-solving;
- design;
- construction planning;
- estimating;
- construction administration.

Architects must confirm with the provincial associations of architects that their services and roles comply with provincial regulations. Architects occasionally lead the development and building process; in fact, the number of architect-led Design-Build firms, particularly in the United States, is growing.

Other Roles for Architects

An architectural education is often valuable for other fields of endeavour. Architects look beyond architecture for careers related to design, planning, and construction, and as specialist consultants. New career opportunities are also available to architects willing to pursue studies in related professions and become specialists with a multi-disciplined background. Some examples include:

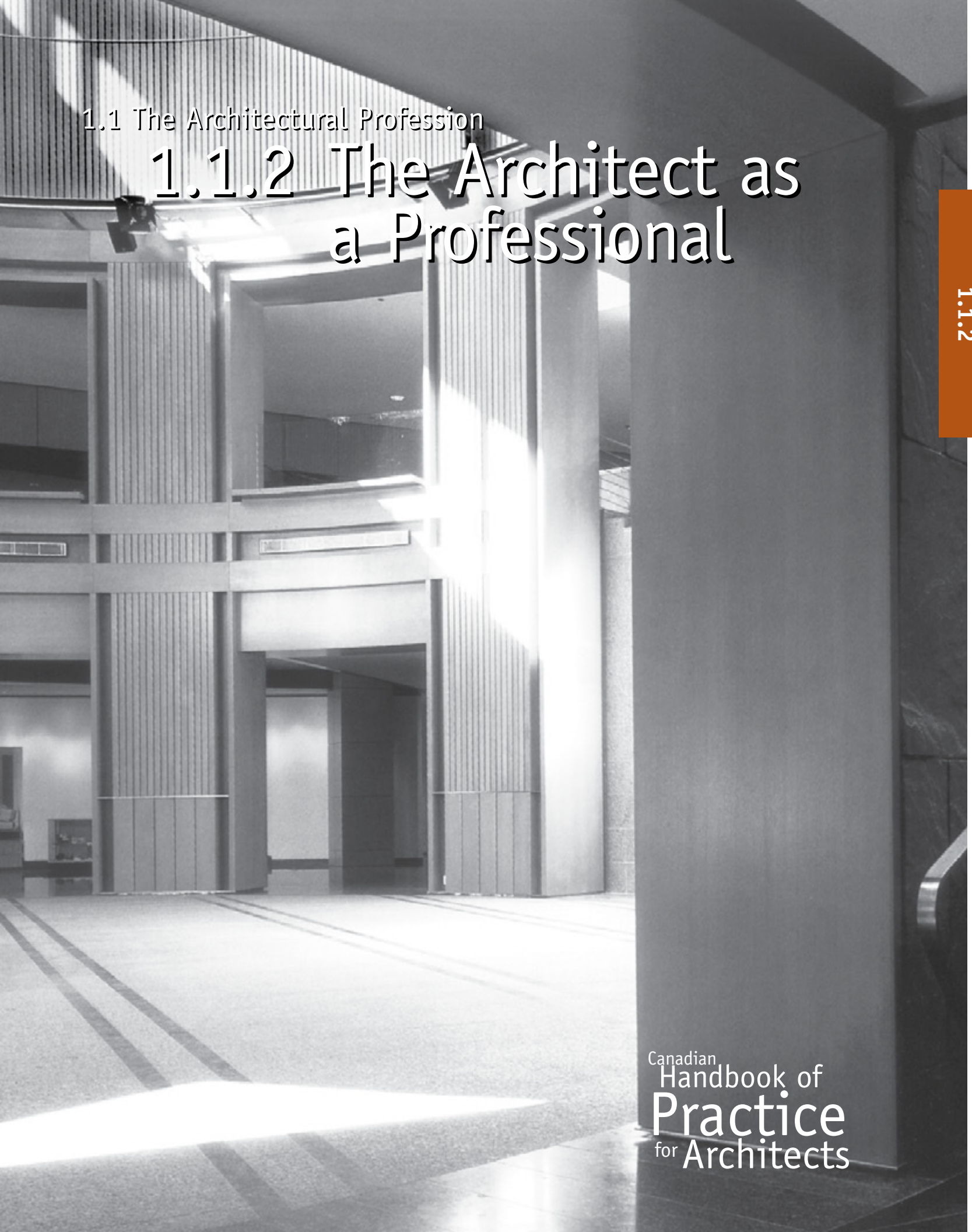
- expert witness;
- architect/engineer;
- architect/planner/urban designer;
- architect/lawyer;
- architect/business administrator;
- architect/facilities planner;
- designer of virtual environments for computers;
- mediator/arbitrator;
- forensic investigator.

Refer to the RAIC website, *Becoming an Architect*, for a list of some of the non-traditional jobs for architects.

References

Cuff, Dana. *Architecture: The Story of Practice*. Boston, MA: Massachusetts Institute of Technology Press, 1991.

1.1.2 The Architect as a Professional



1.1.2

Introduction

Professionalism

Principles of Professionalism
- Expertise
- Autonomy
- Commitment
- Accountability

Professional Liaibility Insurance

Characteristics of Professionals

Architecture as a Profession
- Architecture and Engineering
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The Architect as a Professional

Introduction

> *Membership in any profession, whether law, medicine, teaching, journalism, accounting, or architecture, entails not only the mastery of a body of knowledge and skills but at its best the honoring of a social contract to advance basic human values.*
> (Boyer and Mitgang)

This dedication to advancing the human condition is one aspect which distinguishes professions from other occupations. Public trust is another.

Most professions in Canada, including architecture, are self-governing and self-regulating. The provinces and the Northwest Territories, through enabling legislation (the provincial and territorial architects acts), have established associations which regulate admission to the profession in exchange for safeguarding the public. The provincial and territorial associations of architects are mandated to maintain high standards of practice and ethics among their members.

Refer also to Chapter 1.1.5, *The Organization of the Profession in Canada*.

Professionalism

Historically, the professions were the scholarly endeavours and practices of theology, law, and medicine (the so-called "learned" professions), which had certain principles and characteristics distinct from other vocations. Increasingly, other occupations are adopting some of the principles that these three professions originally exemplified.

Unfortunately, the expression "profession" or "professional" is often misused and overused, and applied to virtually all vocations. This use of the term is an attempt to capitalize on the prestige associated with the original status enjoyed by scholarly professions. Today, the expression does not necessarily represent an adherence to the principles of professionalism.

To be worthy of the term, all professionals must conduct both their personal and business lives according to certain fundamental principles. The International Union of Architects (UIA) has attempted to identify and describe these principles in its *UIA Accord on Recommended International Standards of Professionalism in Architectural Practice*.

Principles of Professionalism

All professionals are required to adhere to the following four principles:

- expertise;
- autonomy;
- commitment;
- accountability.

Expertise

Professionals possess a comprehensive *body of knowledge, skills, and theory developed through education and experience*. The process of professional education, experience, and examination is structured to assure the public that professionals engaged to perform professional services have acquired the expertise to perform them to acceptable standards.

To achieve proficiency, professionals undergo intensive preparation, gaining specialized knowledge in an academic setting. This education is usually followed by some period of training or internship. Because acute judgement is such an essential skill in the provision of services, professionals are required to be proficient, adept, skilled, and expert. While in practice, professionals continue their

personal scholarship, their quest for knowledge, and their growth by experience. In addition, they should be teachers and mentors to those in training for the profession.

Autonomy

Professional practitioners provide *expert advice* to their clients, independent of any self-interest. *Uncompromised professional judgement* should take precedence over any other motive. Professionals are at liberty to exercise discretion, and clients value their judgement and authority. They act independently and accept responsibility for their actions.

Professionals must also embrace the spirit and the letter of the laws governing their professional affairs, and thoroughly consider the social and environmental impact of their professional activities.

Commitment

Professionals bring a high level of *dedication to the work* done on behalf of their clients and society. Members of professions are mandated to serve their clients in a competent and professional manner, and to exercise unprejudiced and impartial judgement on their behalf.

Accountability

Professionals are aware of their *responsibility to provide independent* and, if necessary, *critical advice* to their clients and for the effects of their work on society and the environment. Professionals undertake to perform professional services only when they, together with those whom they may manage or consult, are qualified by education, training or experience in the services offered.

Professionals accept personal responsibility and liability for the consequences of their professional behaviour. Furthermore, professionals are expected to protect not only the primary interest of their clients but also the interest of the public. Professionals must provide and exercise the *standard of care* typical of their profession, but they are not required to have an extraordinary degree of skill.

Professional Liability insurance

The professions vary in their requirements for mandatory professional liability insurance. In jurisdictions where insurance is not mandatory, professionals must consider whether or not to obtain professional liability insurance which will protect them, to a certain extent, from a claim by a client or member of the public as a result of an error, omission or negligence in the provision of professional services.

Under some provincial and territorial statutes of limitations there is a limitation period for bringing an action related to professional services; however, in certain jurisdictions the risk can endure for a lifetime.

Refer to the "Chart: Comparison of Statutes of Limitations in Each Province and Territory" at the end of Chapter 2.1.9, *Risk Management and Professional Liability*.

Characteristics of Professionals

Professionals consistently act with integrity and competence by adhering to the principles of professionalism. Moreover, professionals:

- *are organized through a membership registration* process for the purpose of setting standards for admission, ethics, and practice. An oath of service to the public interest is frequently required as a condition of entry to the profession;
- *set protocols for disciplining* members whose conduct does not meet professional standards or a prescribed code of conduct;
- often earn *respect* in the community;
- *share knowledge* within their profession and engage in *lifelong learning*;
- *develop specializations*, and often become expert in particular fields;
- have a *strong personal identification with the profession* and altruistic concerns for society;
- are usually *highly creative and innovative* in their research, academic pursuits, and practice, valuing discovery, invention, and expression;
- *test, challenge, and push all boundaries and parameters of the profession* in order to advance the profession's scholarly and technical capabilities.

Architecture as a Profession

Architecture, which has been described as a social art (and also an artful science), is the sole profession whose members are qualified to design and to provide advice, including technical and aesthetic judgement of the built environment. Architects provide services and solutions with technical competence and aesthetic sensitivity suitable to the physical, social, cultural, and economic environment, thereby inspiring the community and its citizens. In matters of public health and safety, architects are obliged to serve the public interest and respond to the public need. The concepts of health and safety are expanding to encompass the sustainability of the global environment and accessibility for all persons.

The four generic principles of professionalism previously outlined in this chapter apply to architecture. But what distinguishes architecture from other professions? In the broadest of terms, architecture is the profession which endeavours to identify the public need, and to serve the public interest, in matters relating to the built environment. In this context, architecture is environmental design; in fact, any manipulation of the physical environment is of potential interest to architects. Other disciplines, such as landscape architecture, share in the design of the built environment.

The practice of architecture is usually broader than the regulations governing the profession. However, legislation formalizes a specific relationship between the profession and society by setting certain regulations which limit and define membership and practice. An architect's proficiency may extend well beyond the requirements of registration/licensure — particularly after extensive experience. For example, although a statute or regulation may not define "urban design" or single-family house design as architecture, most architects would agree that it is, to a significant degree, an architectural endeavour. Not including urban design in its legislation demonstrates a jurisdiction's decision to regulate only a certain portion of architecture which it deems to be the "profession of architecture" under its legislative authority.

Although the "practice of architecture" is defined in each provincial or territorial architects act, there is no standard definition for this term. The UIA has proposed an all-encompassing definition (refer to the definition of the **"Practice of Architecture"** at the end of this chapter).

The profession's academics and philosophers are not limited or constrained in their definition of architecture, whereas practitioners face the reality and limitations of licensure and regulation. Such a divergence is healthy and encourages:

- pushing both practical and scholastic architectural limits;
- opening new opportunities;
- discovering unrecognized public needs.

Architecture and Engineering

Almost all architects work closely with professional engineers who form part of the design team. Professional engineering adheres to the principles of professionalism and is regulated in a manner similar to architecture. In Canada, most jurisdictions have legislation to identify which professional services or building types fall under the authority of architecture or engineering.

The differences between the professions of architecture and engineering can be summarized as follows:

- the educational background required for architecture is more diverse than it is for engineering;
- the experience requirement is more wide ranging for architects and more specific for engineers;
- the architect is expected to understand, assemble, and coordinate all of the building disciplines, whereas the engineer usually specializes in one discipline;
- the architect should be involved in all buildings and environments for human habitation and occupancy, but architects are often not involved in other structures requiring engineers, such as warehouses and bridges;
- the architect is involved not only in the building design but also is concerned about the impact of a building or buildings on the character of a community;

- architects have traditionally filled the role of the prime professional responsible for managing and coordinating a project.

The Architect's Seal

An important symbol and tool of the architectural profession is the architect's seal. An architect's seal is a professional seal and not a business seal. The seal must be applied to certain documents prepared by the architect (or Holder of a Certificate of Practice). Issued by the provincial or territorial association, the seal assures the public and Authorities Having Jurisdiction that they may rely on these documents with confidence. For information on the proper application of the professional seal, refer to the Provincial or Territorial Association Practice Bulletins and to "Charts: Comparison of Practice Requirements of Each Provincial and Territorial Association" at the end of Chapter 1.1.5, *The Organization of the Profession in Canada*.

Copyright

All artistic works — including music, photography, paintings, drawings, artistic crafts, and architectural designs — are intellectual property belonging to their creator. In Canada, a copyright does not have to be registered. It rests automatically with the author, and so does the responsibility to demonstrate any ownership of copyright by the author. The *Copyright Act* protects the architect's designs and drawings from unauthorized use or copying. The ownership of the copyright rests with the architect unless the architect assigns it in writing to someone else. Architects are advised to retain ownership of the copyright in all instances. Copyright protection is also provided in the Standard Forms of Agreement. Refer to General Conditions in the RAIC Document Six - *Canadian Standard Form of Contract Between Client and Architect*.

Refer also to Appendix A, Digital Copyright and Architects, in Chapter 2.3.7, *Construction Documents - Drawings*.

Building Inscriptions

Occasionally, the architect will arrange for the installation of a permanent inscription on a building, which may identify the construction date, owner, architect, and builder. Traditionally, a cornerstone was used; however, today, other suitable signs or inscriptions are provided on the permanent fabric of the building.

Non-Professionals and the Built-Environment

It is important, especially for the public and for clients, to understand that there are many other disciplines that provide services for design and construction and that these individuals are not regulated professionals. Architects and engineers are regulated by provincial and territorial statute which provides both title protection and a scope of practice. Other non-professionals may provide services under a limited scope of practice and they may not have the same accountability as professionals. Some of these non-professionals include architectural technicians and technologists, cost consultants, construction managers and designers.

In the province of Québec however, technologists are regulated under the Office des professions.

Definitions

Architect: A person or entity registered, licensed or otherwise authorized exclusively to use the title "architect" and to practise architecture in a province or territory.

Practice of Architecture: The practice of architecture consists of the provision of professional services in connection with town planning as well as the design, construction, enlargement, conservation, restoration or alteration of a building or group of buildings. These professional services include, but are not limited to: planning and land-use planning; urban design; provision of preliminary studies, designs, models, drawings, specifications, and technical documentation; coordination of technical documentation prepared by others (consulting engineers, urban planners, landscape architects, and other specialist consultants) as appropriate and without limitation; construction economics; contract administration; monitoring of construction (referred to as supervision in some countries); project management. (*UIA Accord on Recommended International Standards of Professionalism in Architectural Practice)*
Note: also refer to each provincial architects act for a legal definition.

Profession: A vocation or calling, especially one that involves some branch of advanced learning or science.
(adapted from the *Oxford Dictionary*)

References

American Institute of Architects (AIA). *The architect's handbook of professional practice – Chapter 1 – Professional Life*. 14th edition. Hoboken , New Jersey: AIA, 2008.

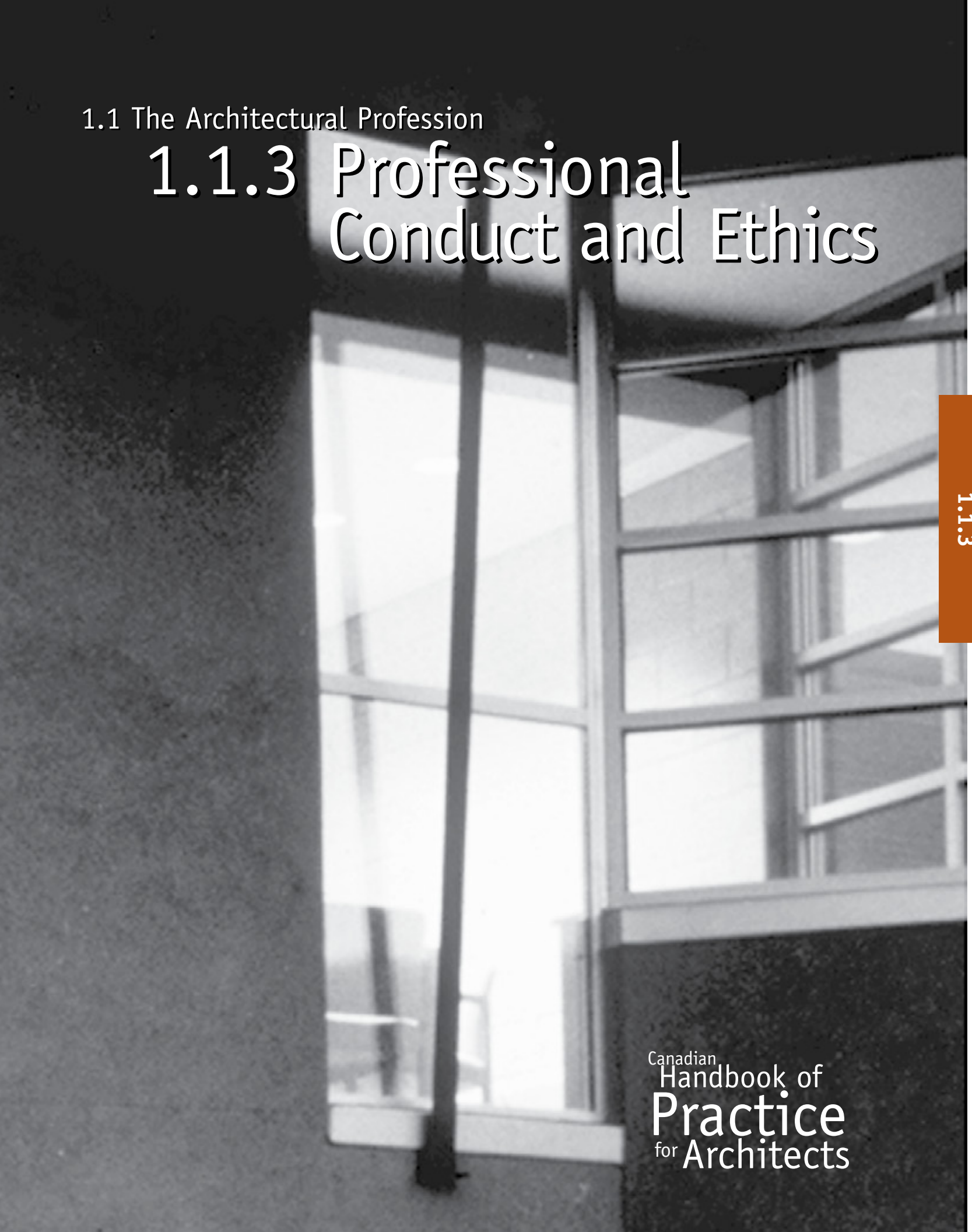
Belfall, Donald. *Professions in Transition*. Toronto: Canadian Society of Association Executives, 2008.

Boyer, Ernest L and Mitgang, Lee D. *Building Community: a new future for architecture education and practice: a special report*. Ewing, NJ: California Princeton Fulfillment Services, 1996.

International Union of Architects (UIA). *UIA Accord on Recommended International Standards of Professionalism in Architectural Practice*. Paris, France: adopted by the UIA in June 1999. *www.uia-architectes.org/image/PDF/UIA-Accord%20full_def.pdf*

National Council of Architectural Registration Boards (NCARB). *Architecture As It Differs From Engineering*. Washington, D.C.: NCARB, April 1995.

1.1.3 Professional Conduct and Ethics



Canadian Handbook of Practice for Architects

1.1.3

Introduction

The Role of the Provincial and Territorial Associations of Architects

Regulations

Codes of Ethics and Professional Conduct

Complaints and Discipline Proceedings

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Appendix — Summary of Code of Ethics and Professional Conduct of the AIBC and SAA

- Competence
- Conflict of Interest
- Full Disclosure
- Compliance with Laws
- Professional Conduct

Professional Conduct and Ethics

Introduction

Being a professional means having a high level of knowledge and skills; meeting certain standards of professionalism, integrity, and competence; and abiding by codes of conduct and ethics. Professional responsibility forms the basis of ethical behaviour. Like other professionals, architects are responsible to the public, their clients, their fellow professionals, and the environment. Architects are also duty-bound to ensure the continuation of the profession. This chapter will briefly discuss codes of conduct and ethics for the architectural profession in Canada.

The Role of the Provincial and Territorial Associations of Architects

Conduct is behaviour. The criteria for acceptable and unacceptable behaviour of an architect are set out in the architects acts and the subsidiary bylaws and regulations of each province. When an individual becomes registered or licensed as an architect, he or she assumes certain professional rights and obligations. In most jurisdictions in Canada, each applicant declares in writing (and in some provinces, the architect must swear an oath) to uphold the profession's standards of conduct, sometimes by reference to the architects act of the province or territory. The architects act and its subsidiary bylaws or regulations codify the rules of conduct for architects.

The provincial or territorial architects act (or the Professional Code in Québec) authorizes a provincial or territorial association of architects to regulate its members by empowering the association to:

- set *eligibility criteria* for becoming an architect;
- set *conduct regulations* for architects;
- investigate and adjudicate allegations of an architect's *professional misconduct*;
- *discipline* an architect it judges to be guilty of misconduct.

Refer to Chapter 1.1.4, *Admission to the Profession*, for a discussion of the criteria or requirements for becoming an architect.

Each of the architects acts is worded differently and reflects the unique customs and history of the architectural profession in that province or territory. Nonetheless, the acts and regulations are similar regarding architects' rights and obligations and disciplinary procedures. An architect who does not comply with a conduct requirement (sometimes called "professional misconduct") might be reprimanded, fined, or have his or her licence temporarily suspended or permanently revoked.

Regulations

The existing bylaws or regulations in each province or territory can be broadly sub-divided as follows:

- *Ethical Regulations or Codes of Ethics*
  (those rules that assist in maintaining the public trust in the integrity of the profession)
  Examples include rules requiring behaviour that exemplifies traits of personal character such as honesty, impartiality, and respect for the law. Ethical principles are fundamental to all the rules and regulations. For example, honesty is implicit in the requirement that an architect shall not knowingly make a false representation.

- *Regulations regarding Competency*
  (those rules that ensure the proper provision of architectural services to the public)
  Examples include rules about the standard of

care that shall characterize an architect's advice or service; rules about the architect's supervision of staff; and rules about the application of an architect's seal.

- *Administrative Rules and Regulations* (those rules that assist in the efficient operation of the provincial or territorial association)
  Examples include: rules about the timely payment by an architect of annual membership fees; procedures for election to the association's council; procedures for changing a bylaw or regulation; and rules that require an architect who is aware of an apparent violation of the architects act to report it to the association.

Many rules of conduct stem from moral customs. They regulate the manner in which an architect relates to others, for example:

- rules against offering or receiving bribes;
- rules against violating laws and building regulations;
- rules that require impartial professional judgement regardless of an architect's personal interests.

It should be noted that ethical codes in architectural practice evolve and adjust to changing societal standards and expectations. For example, in the past, professional misconduct by architects included:

- engaging in construction management or construction;
- advertising their own practices.

In most jurisdictions, and subject to certain qualifications, these actions are now considered acceptable in architectural practice.

Those provinces with societal, legislative, or cultural changes and those with high rates of growth and immigration have tended to periodically update their rules, sometimes comprehensively, so that conduct requirements remain clear to an expanding and increasingly diverse membership.

Codes of Ethics and Professional Conduct

As indicated above, most rules of conduct are found in the various acts, regulations, and bylaws of the provincial or territorial associations of architects. However, consolidating rules about competence and ethical conduct into a separate publication has a number of advantages:

- they can be readily referenced and understood;
- architects do not have to search for conduct rules among all other bylaws, articles of the architects act, and council rulings;
- it provides the context conducive to a full understanding of individual rules.

The National Council of Architectural Registration Boards (NCARB) — the U.S. organization that sets standards, including standards of professional conduct for architects — has developed a model *Rules of Conduct* and has encouraged its adoption by its state Member Boards. The Architectural Institute of British Columbia (AIBC) has developed its own *Code of Ethics and Professional Conduct*, based on the NCARB model. The Saskatchewan Association of Architects (SAA) has adopted a similar code to that of the AIBC in its Bylaw No. 15. For a summary of these two codes of ethics and professional conduct, see the Appendix at the end of this chapter.

In addition, the International Union of Architects or Union internationale des architectes (UIA), through its Professional Practice Commission, has developed *Recommended Guidelines for the UIA Accord on Recommended International Standards of Professionalism in Architectural Practice — Policy on Ethics and Conduct*, intended as a model code for the UIA member sections. The Code of Ethics of the Ordre des architectes du Québec (OAQ) is similar in format to the UIA document.

The model code, which has been adapted for use by the AIBC and the SAA, is organized into the following subject areas:

- competence;
- conflict of interest;
- full disclosure;
- compliance with laws;
- professional conduct.

The UIA model is organized under these headings:

- *General Obligations* (requirements to achieve and maintain competency);
- *Obligations to the Public* (requirements to ensure that professional affairs respect social standards and the environment);
- *Obligations to the Client* (requirements to ensure proper professional service and judgement);
- *Obligations to the Profession* (requirements to uphold and respect the dignity of the profession);
- *Obligations to Colleagues* (requirements to respect professional colleagues).

Complaints and Discipline Proceedings

The provincial and territorial associations of architects have established similar procedures for reprimanding or punishing architects who are guilty of professional misconduct. Most associations have standing committees which investigate formal complaints against members or practices. If the complaint is found to be valid, the matter is typically referred to another committee — a "discipline committee," as it is called in most associations.

In some provincial and territorial associations, the Discipline Committee may hold a hearing concerning conduct of the members referred to it. The Discipline Committee is also responsible for setting punishment for architects who are found guilty of contravening the architects act, regulations or bylaws. Disciplinary hearings are quasi-judicial proceedings and therefore must follow due process of law. The association and the architect accused of professional misconduct are sometimes represented by legal counsel. Typically, the findings of a discipline committee and its punishments are published and distributed to the membership at large. Such publication has the following benefits:

- reinforcing the prevailing ethical standard;
- demonstrating to society that the profession is exercising its mandate;
- providing a deterrent against unprofessional conduct by other architects;
- delivering continuing education to architects to refresh their knowledge on matters of conduct.

Definitions

Code: A set of rules, or systematic collection of statutes or body of laws arranged to avoid inconsistency and overlap; standard of moral behaviour.

Complaint: Formal written accusation or statement of grievance.

Discipline: Order maintained among members of a profession; control exercised over members of an organization; chastisement.

Ethics: Moral principles or rules of conduct.

References

International Union of Architects (UIA). *Recommended Guidelines for the UIA Accord on Recommended International Standards of Professionalism in Architectural Practice — Policy on Ethics and Conduct.* Paris, France: UIA.

National Council of Architectural Registration Boards (NCARB). Washington, D.C. *Professional Conduct.* Washington, D.C. 2000

Provincial and Territorial Associations of Architects:

Architectural Institute of British Columbia, *Code of Ethics and Professional Conduct*, December 2002: Revision #2: February 2004.

Alberta Association of Architects, *Architects Act*, RSA 2000, Chapter A-44, and the *Architects Amendment Act*, 2006 (passed but not yet brought into force). *Code of Ethics*, A.R. 240/1981

Saskatchewan Association of Architects, Bylaw No. 15, *Code of Ethics and Professional Conduct*, August 1997.

Manitoba Association of Architects, General By-law, Article Fifteen, *Professional Ethics and Conduct*, May 10, 2008.

Ontario Association of Architects, *Regulation 27* under the *Architects Act*, Section 42 (describing professional misconduct), 1990.

Ordre des architectes du Québec, *Regulation Respecting the Code of Ethics*, July 18, 1991.

Architects' Association of New Brunswick, General By-law No. 15, *Professional Misconduct*, as amended 1990.

Nova Scotia Association of Architects, *Architect's Act*, 1975; Regulations Pursuant to the Architect's Act; *Code of Ethics and Professional Conduct*, 1998.

Architects Association of Prince Edward Island, *Code of Ethics*, 1978.

Newfoundland Association of Architects, *Code of Professional Conduct*, October 4, 1989.

Northwest Territories Association of Architects, General By-Law, *Code of Ethics*, Revised March 2008.

Appendix — *Summary of Code of Ethics and Professional Conduct* of The AIBC and SAA

The following is a summary of the Code of Ethics and Professional Conduct from the AIBC (Architectural Institute of British Columbia) and the SAA (Saskatchewan Association of Architects) which is based on the model developed by NCARB (National Council of Architectural Registration Boards).

Competence
Regulations governing competence are based on the assumption that the end result of an architect's services — a building — shall be fit, in all applicable regards, for its intended purposes. These rules state that:

- architects must provide reasonable care, competence, knowledge, skill, and judgement to clients and the public;
- architects' consultants must be similarly competent;
- architects must not undertake to provide services beyond their personal competence.

The test of competence is if another architect, being reasonable and prudent, would have provided similar services at the same time and place. When a provincial association receives a complaint of incompetence against one of its members, it may respond through an evaluation of the architect's services by his or her peers. If they find incompetence, then the architect could be subject to penalties imposed by the association. The aim is to protect the public from further incompetence by ensuring that the architect either raises his or her skills and services to prevailing professional standards or, failing this, stops practising.

Conflict of Interest
Architects must avoid actions and situations in which their personal interests conflict, or appear to conflict, with professional obligations to the public, the client, and others. Rules about conflict of interest include the following:

- An architect shall be compensated by only one party on a project except when the other interested parties agree in writing to another arrangement.
- An architect with a personal association or interest in a project shall disclose this in writing to the client or employer. If they have objections, then the architect must either terminate the association or interest, or offer to give up the commission or employment.
- An architect shall not solicit or accept compensation or benefits from suppliers in return for specifying or endorsing their products, except as permitted.
- An architect acting as an interpreter of construction contract documents and reviewing construction for conformance with the contract documents shall render decisions impartially.
- An architect may be a project's owner. An architect may also be the constructor of a project of the architect's own design. In such cases, the architect shall:
  - disclose any interest in writing to the other contracting parties and the Authority Having Jurisdiction;
  - receive their written acknowledgement;
  - provide professional services as if disinterested.
- An architect who is a juror or advisor to an approved competition shall not subsequently provide services to the winner or, if there is no winner, receive any commission deriving from the competition.

Full Disclosure

This principle refers to an architect's obligation to accurately represent the full truth. For example:

- An architect shall disclose all related personal or business interests when making a public statement on an architectural issue.
- An architect shall accurately represent to the public, prospective or existing client or employer the qualifications and scope of responsibilities in connection with work for which the architect is claiming credit.
- If an architect becomes aware that the employer or client is acting against professional advice and violating applicable building regulations, the architect shall:
- refuse to consent;
- report the action to the Authority Having Jurisdiction;
- terminate services on the project.
- An architect shall not knowingly make or assist others to make a false or misleading statement or omission of material fact about education, training, experience or character when applying for or renewing registration as an architect.
- An architect who knows of an apparent violation of the architects act, bylaws, or council rulings shall report such knowledge to the association.
- An architect who has a financial interest in a building product or device which the architect proposes to specify for a project shall disclose this to the client, receive the client's written approval, and include a copy of the client's approval in the construction documents.

Compliance with Laws

An architect must respect and comply with laws and regulations. For example:

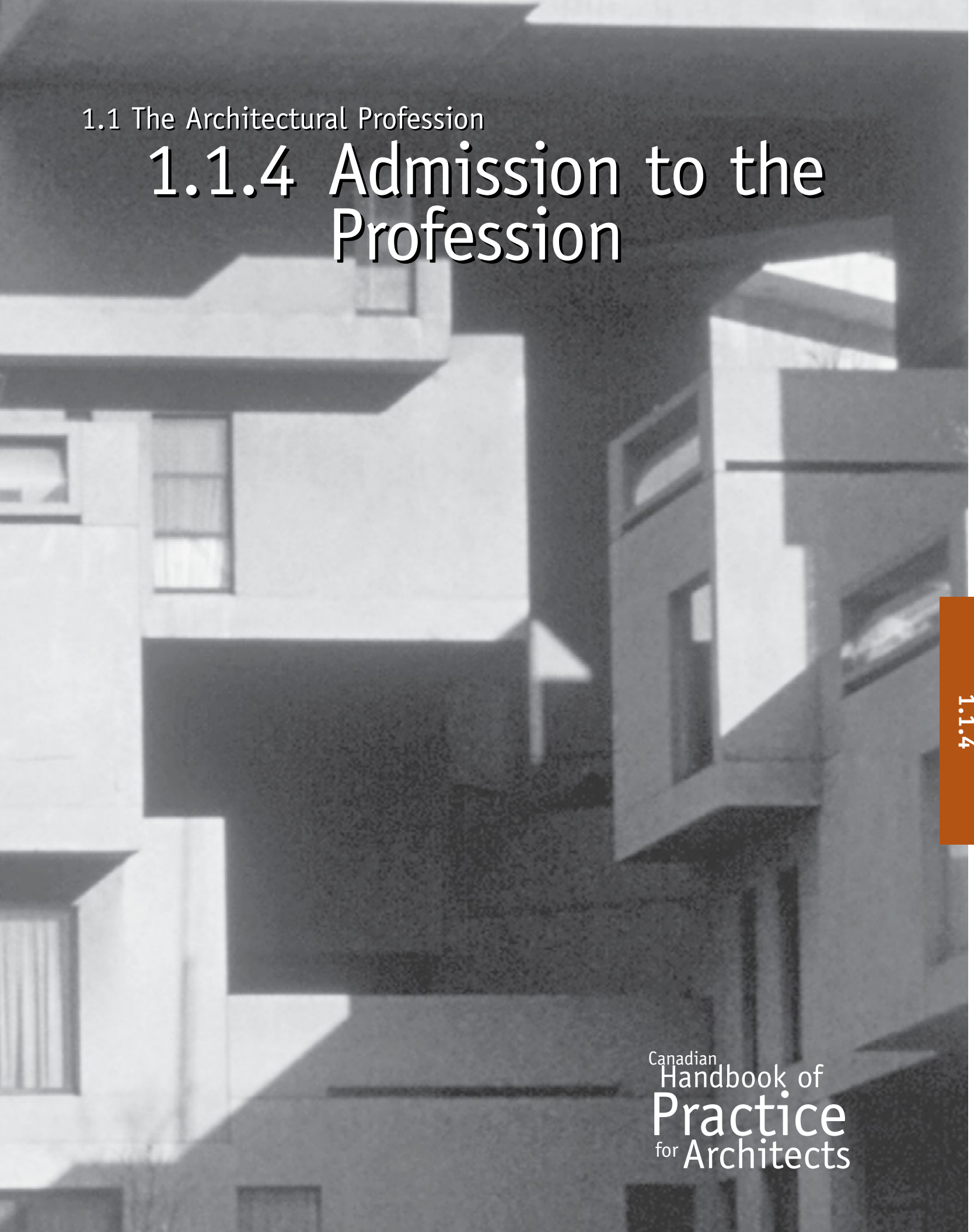
- In the practice of architecture, an architect shall not knowingly violate any law or regulation.
- An architect shall neither offer nor make payment or gift to a public official (elected or appointed) with the intent of influencing the official's judgement in connection with a prospective or existing project.
- An architect shall comply with the relevant architects act and its bylaws and council rulings.
- In the practice of architecture, an architect shall take into account all applicable federal, provincial, and municipal building bylaws and regulations. The architect may rely on the advice of other professionals and qualified persons as to the intent and meaning of such regulations.

The above sections summarize the principles in the AIBC and SAA Codes of Conduct, plus additional requirements of many other Canadian provincial associations.

Professional Conduct

This section includes rules based on principles that are not covered in the preceding sections, as well as rules that may not be conduct requirements in every province. Examples of such conduct requirements include:

- the supervision of an architectural office by an architect;
- the use of the architect's seal;
- the prohibition of the following acts:
  - offering gifts other than of nominal value to a prospective client;
  - committing fraud or having wanton disregard for the rights of others;
  - performing any act that would reflect unfavourably on the profession;
  - falsely or maliciously injuring another architect's reputation or business prospects;
  - attempting to supplant another architect after the other has been retained or is in the process of being retained;
  - accepting the same commission as another architect before the other has been dismissed;
- the requirement to:
  - comply with competition rules approved by the Council of the provincial association;
  - promptly distribute monies received for others;
  - comply with the provincial association's performance standards together with appropriate fees for services.



1.1 The Architectural Profession

1.1.4 Admission to the Profession

1.1.4

Canadian Handbook of Practice for Architects

1.1.4

Introduction

Education
- Role of the Canadian Architectural Certification Board (CACB)
- Canadian Education Standard
- Professional Degree Programs in Architecture
- Accreditation of Professional Degree Programs
- RAIC Syllabus (RAIC Center for Architecture at Athabasca University)

Experience
- Intern or Intern Architect Program
- Role of Employers
- Role of Mentors
- Experience Categories

Examination for Architects in Canada (ExAC) and the Architect Registration Examination (ARE)

Licensing/Registration
- Procedure
- Reciprocity Agreement Between Canadian Architectural Licensing Authorities
- Inter-Recognition Agreement Between the NCARB and the former CCAC
- Mutual Recognition Agreements

Continuing Education / Professional Development

Definitions

References

List: Canadian University Schools of Architecture with Accredited Programs

Admission to the Profession

Introduction

Canada's provincial governments have jurisdiction over professional practice. This responsibility is entrusted by legislation to various provincial professional associations, which regulate members of their respective professions for the protection of the public. Provincial and territorial associations of architects, sometimes referred to as the licensing authorities, have established admission requirements and standards to ensure that candidates are competent to practise architecture.

The ten provincial associations of architects and the Northwest Territories Association of Architects have adopted common admission standards, which involve:

- education or training in architecture;
- experience, or workplace internship;
- examination.

These three components may overlap, to the benefit of the student or intern. For example, internship experience acquired during an academic program enables students to better appreciate and understand the concepts being taught. Writing certain sections of the Examination for Architects in Canada (ExAC) or the Architect Registration Examination (ARE) permits the intern to apply or demonstrate knowledge, skills, and abilities acquired during internship.

Education

Role of the Canadian Architectural Certification Board (CACB)

The provincial and territorial associations of architects have entrusted the Canadian Architectural Certification Board (CACB) to:

- certify the academic qualifications of candidates;
- accredit programs offered by Canadian university schools of architecture.

The CACB is a not-for-profit organization representing both licensing authorities and architectural educators.

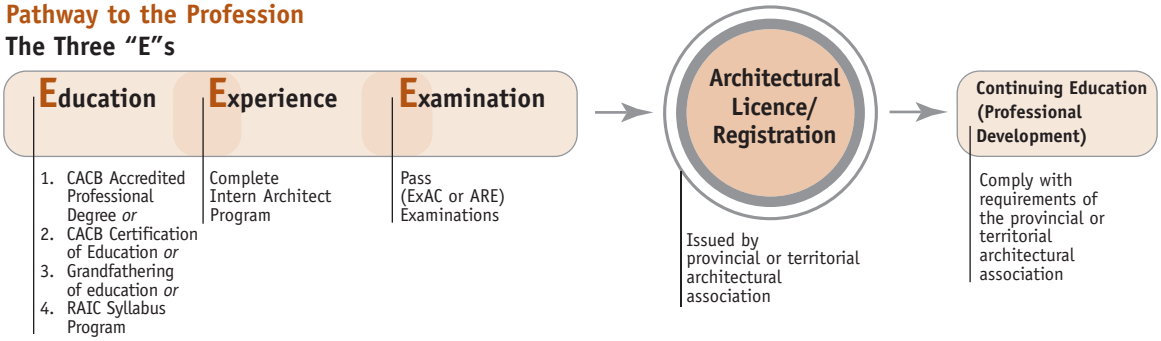
Canadian Education Standard

The associations of architects have developed "Conditions and Procedures for the Certification of Educational Qualifications required for Admission (Registration or Licensing) to Provincial and Territorial Architectural Associations in Canada". This document prescribes various educational requirements in detail including the length, structure and content of courses which must be fulfilled to receive a professional degree in architecture.

Individuals can satisfy the requirements of the Canadian Education Standard in four ways:

Pathway to the Profession

The Three "E"s



- *Accredited Degree*

by obtaining a professional degree (master's degree in Canada) from an architecture program accredited by the CACB or its U.S. counterpart organization, the National Architectural Accrediting Board, Inc. (NAAB);

- *Certification of Education*

by submitting the academic record of a non-accredited degree for evaluation according to the education requirements outlined in the Canadian Education Standard (candidates who have completed all or part of their post-secondary studies outside Canada must provide a statement regarding the equivalency of the courses; candidates whose records do not meet the requirements may upgrade their training by taking appropriate courses or workshops);

- *Grandfathering*

through registration or licensing by a provincial association of architects prior to July 1, 1976; or, for the province of Québec, registration/ licensing by the Ordre des architectes du Québec prior to 1992; or, for the province of Alberta, certification by the Universities Co-ordinating Council;

- *RAIC Syllabus (RAIC Centre for Architecture at Athabasca University)*

by obtaining a diploma from the Royal Architectural Institute of Canada (RAIC) Syllabus Program (a workplace program, supplemented by courses and examinations).

Professional Degree Programs in Architecture

University programs in architecture provide training which includes critical analysis and integration of knowledge.

Analytical study (theoretical courses) provides general knowledge required to undertake the design and construction phases involved in the development of the built environment. Subject areas include:

- history;
- behavioural psychology;
- socio-cultural studies;
- programming;
- building sciences;
- construction;
- regulations;
- safety;
- structures;
- electrical and mechanical services;
- quantity surveying;
- environmental assessment.

Integration (design studios) enables students to develop their creativity and gain the necessary self-reliance to make responsible architectural decisions. Students learn to generate outcomes by putting together the various, and sometimes conflicting, requirements that are unique to each project.

Canadian programs are currently offered at both the bachelor level (B.Arch.) and the master's level (M.Arch.); however, the professional degree is being granted only at the master's level. Programs may last from five to seven years.

Accreditation of Professional Degree Programs

To obtain accreditation from the CACB, all professional degree programs must demonstrate, through an Architecture Program Report (APR), that they follow certain procedures and meet certain criteria, including the "student performance criteria." A CACB Visiting Team travels to each school to verify the accuracy of the APR. The team also assesses examples of students' work against the student performance criteria and recommends whether to accredit the program.

Programs may be granted accreditation for two, three or five years depending on the fulfilment of CACB conditions.

RAIC Syllabus (RAIC Centre for Architecture at Athabasca University)

The RAIC Syllabus program was recently restructured and this work-study program will now be delivered and administered through Athabasca University, a university that specializes in distance education. The renewed Syllabus Program at Athabasca University provides an alternative path for those individuals who cannot undertake a full-time university program. The program offers a B.Sc. (Architecture) and a professional diploma - the Graduate Diploma in Architecture.

The RAIC Syllabus new mission is "to provide an inclusive and accessible professional architectural education according to rigorous standards of excellence that lead to Canadian professional certification. The bilingual program is to be made available nationally according to a financially sustainable model, through varied study opportunities exploiting available technologies and managed work experience."

Experience

Intern or Intern Architect Program

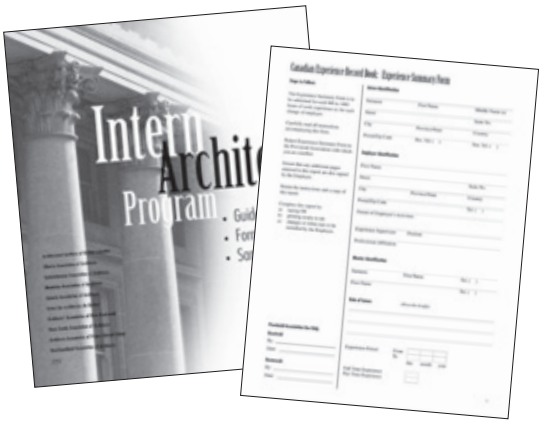
The objective of internship prior to licensing/ registration is to ensure that the candidate gains enough experience to:

- meet generally recognized standards of practical skill;
- practise architecture in a way that protects the health and safety of the public.

The provincial and territorial associations of architects established the Internship in Architecture Architect Program (IAP). The IAP is a standardized, national system for periodic documentation and evaluation of internship activities. It provides a structured transition between formal education and registration/ licensing. In addition, the program encourages experienced practitioners to become more involved in the development of their future colleagues.

Candidates are advised to register for the IAP with their provincial or territorial architectural association as soon as they are eligible. Eligibility occurs after candidates have completed:

- at least 50% of an accredited professional architecture degree program;
- Part 1 of the RAIC Syllabus or 50% of the graduate diploma in architecture.



Procedures are described in the IAP Manual which includes:

- guidelines;
- forms;
- sample letters;
- the Canadian Experience Record Book, a requirement for recording work experience.

On application, candidates must complete the appropriate form to confirm the names of employers (or the equivalent) and mentors.

The Canadian Experience Record Book is also available on the RAIC website as an interactive form to be completed and printed for submission to the licensing authorities by interns.

Role of Employers

Employers direct and supervise interns on a daily basis, assess the quality of their work, and certify the intern's documentation of work experience. Architects usually serve as employers, but other professionals involved in the built environment are sometimes permitted to perform this supervisory role.

Role of Mentors

The mentor is an architect selected by the intern. The mentor meets with the intern to regularly review the progress of the intern's experience and to discuss his or her career goals and broad professional issues.

Experience Categories

The Intern Architect Program requires interns to complete a total of 5,600 hours of experience (over a minimum of two and a half years) in the following categories:

Categories	Minimum required hours
Design and Construction Documents	2,800
Construction Administration	560
Management	280

Categories	Total hours permitted
Related Activities	80
Discretionary	1,880

The licensing authorities or provincial and territorial associations are currently reviewing these requirements.

Examination for Architects in Canada (ExAC) and the Architect Registration Examination (ARE)

Over the years, some provincial associations of architects have used various admission examinations to determine whether candidates were competent to be licensed.

Recently, the licensing authorities have developed a new Examination for Architects in Canada (ExAC) to test the minimum standards of competency acquired by an Intern during the Internship period, to ensure both public safety and the professional and skilled delivery of architectural services.

The ExAC, which is composed of four sections, covers the following topic areas as set out in the Internship in Architecture Program:

- Programming
- Site and Environmental Analysis
- Cost Management
- Coordinating Engineering Systems
- Schematic Design
- Design Development
- Final Project
- Bidding and Contract Negotiations
- Construction Phase – Office
- Construction Phase – Site
- Project Management
- Code Research

The principal sources of the examination content are the:

- Internship in Architecture Program (IAP)
- Canadian Handbook of Practice for Architects (CHOP)
- National Building Code 2005 edition

Nevertheless, the provincial and territorial associations will continue to recognize the Architect Registration Examination (ARE), administered by the U.S. National Council of Architectural Registration Boards (NCARB) to ensure that reciprocal licensing for architects is possible throughout North America.

The ARE, which is administered in computer format only, is sub-divided into seven divisions which may be written in any order and at any time at various testing centres in Canada and the United States.

Interns must obtain both of the following from their association of architects:

- "Authorization to Test" (the necessary permission to write the examinations);
- examination results.

Licensing/Registration

Procedure

After successfully completing the three common admission requirements (education, experience, and examination), interns may apply for professional licensing/registration to the architectural association of the province or territory in which they intend to practise. The intern will be granted a licence, renewable on payment of annual dues, providing that the architect complies with the association's bylaws and code of ethics.

Some provincial associations have additional requirements such as attendance at admission courses and/or an oral examination. These additional prerequisites to licensing/registration are available from the provincial or territorial association of architects.

In Québec, French is the official language by virtue of the Charter of the French Language and it is the language used by the Ordre des architectes du Québec (OAQ) in all communications. However, a member may request the OAQ to correspond in English. Whoever becomes a member of the OAQ must demonstrate working knowledge of the French language; therefore, a written or oral examination administered by the Office de la langue française may be required.

[Note: Most licensing authorities, distinguish between the terms "registered (licensed) architect" and "Certificate of Practice." The Certificate of Practice is an additional permit required before providing or offering architectural services to the public.]

Reciprocity Agreement between Canadian Architectural Licensing Authorities

All provinces and the Northwest Territories have adopted common admission standards. The Canadian Education Standard, the Internship in Architecture Program, and the generalized use of the Examination for Architects in Canada (ExAC) or the Architect Registration Examination (ARE) have made admission to the profession virtually identical across Canada. This resulted in a "reciprocity agreement" between the Canadian provincial and territorial associations of architects, which facilitates mobility from one jurisdiction to another.

Specific requirements, mainly related to the unique circumstances of a province, must still be fulfilled (for example, the use of French in Québec, or knowledge of "Philosophy of Seismic Design" in British Columbia).

Inter-Recognition Agreement Between the NCARB and the former CCAC

The Canadian architectural profession was the first profession to negotiate an agreement with its counterparts in the United States under the North American Free Trade Agreement (NAFTA). The accord is called the Inter-Recognition Agreement Between the National Council of Architectural Registration Boards (NCARB) and the former Committee of Canadian Architectural Councils (CCAC). The common admission standards in both countries were contributing factors in reaching this agreement. The commonalities are as follows:

- The CACB's accreditation conditions and procedures are similar to those of the U.S. National Architectural Accrediting Board, Inc. (NAAB). Both organizations recognize programs accredited by each other. Certain details related to Canadian political and demographic features are different.
- The Internship in Architecture Program's objectives, procedures, and duration are similar to those of the Intern Development Program in the United States.
- The Architect Registration Examination (ARE) is identical.

The CCAC and the NCARB signed the Inter-Recognition Agreement. However, each Canadian provincial architectural association and each U.S. Member Board was required to ratify the agreement, forward a Letter of Undertaking, and append specific local requirements, where necessary.

Mutual Recognition Agreements

A mutual recognition agreement is an agreement between two international licensing authorities whereby each authority agrees to recognize and accept the credentials of professionals from the other authority. Over the years there has been considerable work on the part of the Royal Architectural Institute of Canada and provincial and territorial associations of architects in negotiating mutual recognition agreements with other international architectural organizations. To date there is an agreement between architectural licensing authorities from Mexico, United States and Canada. Discussions continue with the Architects Council of Europe (ACE) and the Asia-Pacific Economic Cooperation (APEC) Architect Project.

Continuing Education / Professional Development

All provincial and territorial licensing authorities have adopted mandatory Continuing Education programs and all architects must participate in order to maintain their licence or registration. *[Note: "Continuing education" is also called "professional development" and the Union internationale des architectes (UIA) uses the term "continuing professional development" or CPD]*. Continuing education assists in fulfilling the primary mandate of the associations in the protection of the public by ensuring architects remain competent and current in new technologies and new design developments. Furthermore, these programs enable architects to develop new markets and to improve their practices.

Each provincial and territorial association has slightly different continuing education requirements and each association has its own system for recording continuing education credits or transcripts; however, the RAIC has developed a national system and electronic database which several associations have adopted. Also, the RAIC has facilitated the standardization and harmonization of the various provincial continuing education programs across Canada. This work resulted in the production of document entitled, *Quality Assurance for Continuing Education Activities for the Architecture Profession in Canada* which has been adopted by all associations.

Learning activities, as described in the Quality Assurance document, are divided into two categories: Core Learning Activities and Self-Directed Learning Activities.

Definitions

Accreditation: The process that establishes that an educational program meets an established standard of achievement. Its purpose is to assure the maintenance and enhancement of an appropriate educational foundation. The process is generally done by regular, external monitoring using validated criteria and procedures.

Certification: The official or legal recognition of an individual's qualifications.

Core Learning Activities: are "educational opportunities that provide a fundamental level of knowledge relevant to the practice of Architecture throughout Canada".

Self-Directed Learning Activities: are "educational opportunities that have been selected by an individual". These activities must relate to the practice of architecture or business and must be relevant to the architect's specific situation.

References

Canadian Architectural Certification Board (CACB). Ottawa, Ont.

A Canadian Education Standard for Admission to Provincial Architecture Associations in Canada. January 1992 (revised June 1993).

1998 Conditions and Procedures for Accreditation. July 1998.

1998 Guide to Student Performance Criteria for Faculty and Students of Professional Degree Programme in Architecture. July 1998.

Canadian Architectural Students Association (CASA). *Guide to Canadian Graduate Schools of Architecture*. First Edition 2006
www.casa-acea.org

Committee of Canadian Architectural Councils (CCAC). *IAP Manual*. Ottawa, Ont.: CCAC, Second Edition 2001.

Examination for Architects in Canada
www.cexac.ca

National Council of Architectural Registration Boards (NCARB). *Architect Registration Examination*. Washington, D.C.: NCARB,
www.ncarb.org/are/index.html

Quality Assurance for Continuing Education Activities for the Architecture Profession in Canada
www.raic.org/continuing_education/quality-assurance_e.pdf

Royal Architectural Institute of Canada (RAIC) Syllabus.
www.raic-syllabus.ca

Valence, Jean R., *Architect's Essentials of Professional Development*. American Institute of Architects. Hoboken, New Jersey: John Wiley & Sons, Inc., 2003.

List: Canadian University Schools of Architecture with Accredited Programs

University of British Columbia
School of Architecture and Landscape Architecture
University of British Columbia
402-6333 Memorial Road
Vancouver, BC
V6T 1Z2

Website: *www.sala.ubc.ca*

University of Calgary
Faculty of Environmental Design
Professional Faculties Building, Room 2182
University of Calgary
2500 University Drive NW
Calgary, Alberta
T2N 1N4

Email: evdsinfo@ucalgary.ca
Website: *www.ucalgary.ca/evds*

University of Manitoba
Architecture, City Planning,
Interior Design and Landscape Architecture
201 Russell Building
University of Manitoba
Winnipeg, Manitoba
R3T 2N2

Email: visevicr@cc.umanitoba.ca
Website: *www.umanitoba.ca/faculties/architecture/37.htm*

Carleton University
School of Architecture
202 Architecture Building
1125 Colonel By Drive
Ottawa, Ontario
K1S 5B6

Email: architecture@carleton.ca
Website: *www.arch.carleton.ca*

Université de Montréal
École d'architecture
Université de Montréal
C.P. 6128, succ. Centre-ville
Montréal (Québec)
H3C 3J7

Email: archi@ame.umontreal.ca
Website: *www.arc.umontreal.ca*

Université Laval
Faculté d'aménagement, d'architecture et des arts visuels
École d'architecture
Édifice du Vieux-Séminaire de Québec
1, côte de la Fabrique - bureau 3210
Université Laval
Québec (Québec)
G1R 3V6

Email: arc@arc.ulaval.ca
Website: *www.arc.ulaval.ca*

McGill University
School of Architecture
Macdonald-Harrington Building
815 Sherbrooke Street West
Montréal (Québec)
H3A 2K6

Email: profdegree.architecture@mcgill.ca
Website: *www.mcgill.ca/architecture*

Dalhousie University
Faculty of Architecture and Planning
P.O. Box 1000
Halifax, Nova Scotia
B3J 2X4

Email: arch.office@dal.ca
Website: *http://architectureandplanning.dal.ca/index.shtml*

University of Toronto
Faculty of Architecture, Landscape and Design
230 College Street
Toronto, Ontario
M5T 1R2

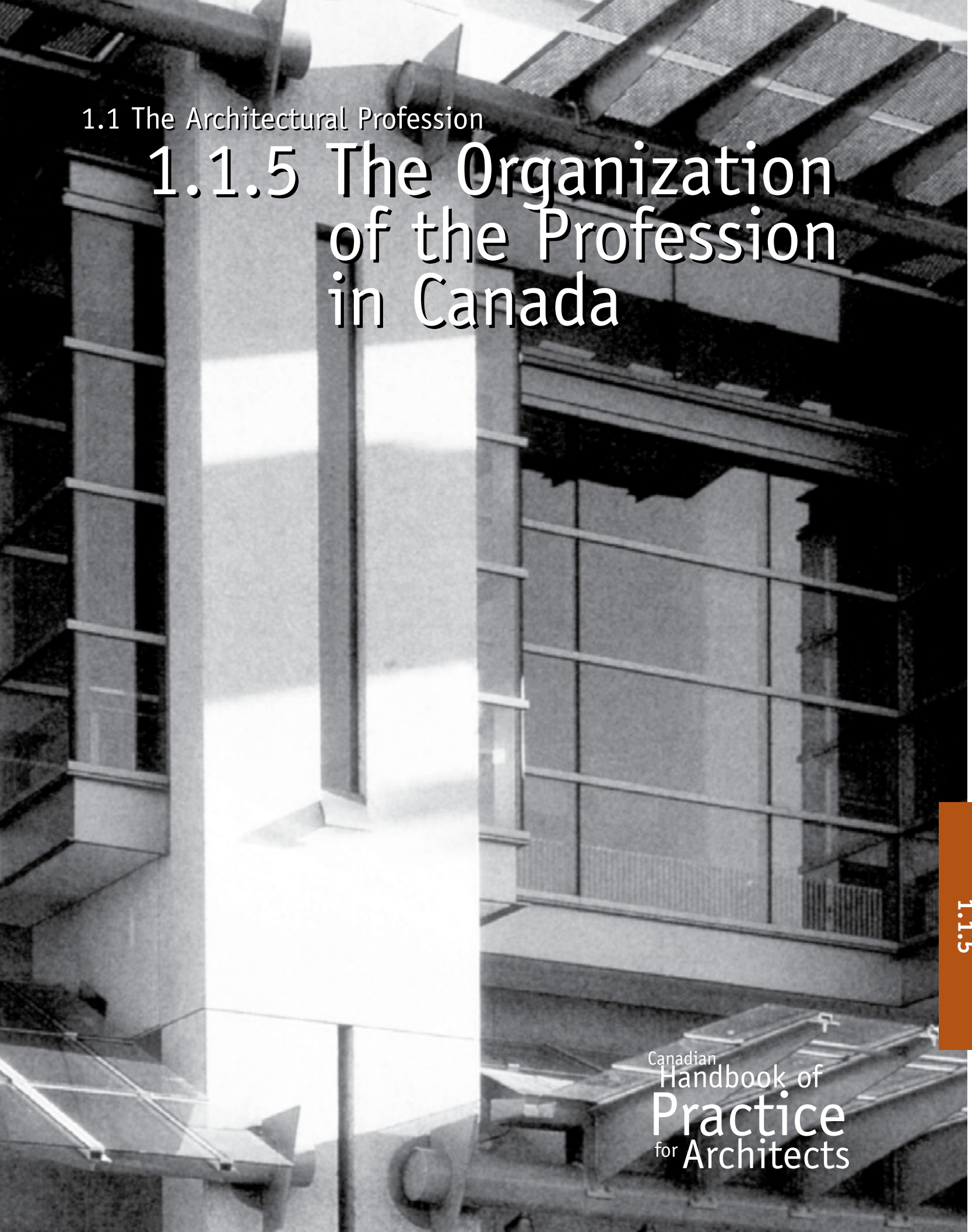
Email: enquiry.ald@utoronto.ca
Website: *www.ald.utoronto.ca/index_main.htm*

University of Waterloo
School of Architecture
7 Melville Street South
Cambridge, Ontario
N1S 2H4

Email : info@architecture.uwaterloo.ca
Website: *www.architecture.uwaterloo.ca*

Ryerson University (as of December 31, 2008 pending accreditation by CACB)
Architectural Science
350 Victoria Street
Toronto, Ontario
M5B 2K3

Email: archsci@acs.ryerson.ca
Website: *www.ryerson.ca/arch*



1.1.5 The Organization of the Profession in Canada

Historical Overview

The Royal Architectural Institute of Canada (RAIC)
- The RAIC College of Fellows
- The RAIC Foundation

Other National Organizations
- The Canadian Architectural Certification Board (CACB)
- The Canadian Council of University Schools of Architecture (CCUSA)

Self-Regulation

Provincial and Territorial Associations of Architects

Reference

List: Provincial and Territorial Associations of Architects

Vital Statistics: Provincial and Territorial Associations of Architects

List and Vital Statistics: National Architectural Organizations

Charts: Comparison of Practice Requirements of Each Provincial and Territorial Association

The Organization of the Profession in Canada

Historical Overview

Canada's architecture profession began to be organized in the 19th century, following trends similar to those in Europe. The Industrial Revolution in the early part of the century, together with technological and societal changes, led to the emergence of architectural societies which responded to the need for:

- regulation of the profession;
- promotion, support, and professional fellowship.

Regulation was required to safeguard public health and safety. Support and promotion were deemed necessary to foster a high standard of professional competence and to influence colleagues and the public.

The first architectural society in Europe was the Society of British Architects, formed in 1834, which became the Royal Institute of British Architects in 1837. Canada followed suit 50 years later with the Architectural Guild of Toronto, established in 1887. The next step was the founding of the Ontario Association of Architects, in 1889 and its incorporation in 1890. In Québec, the Province of Québec Association of Architects was created in 1890, later to become the Ordre des architectes du Québec.

By the turn of the century, demand arose for closer professional ties between provincial groups of architects in Canada. This led to the formation in 1907 of a national organization, the Institute of Architects of Canada. The organization was incorporated under the name "The Architectural Institute of Canada" by act of the Dominion Parliament on June 16, 1908. The new Institute formed an alliance with its British counterpart, the Royal Institute of British Architects. In 1909, after receiving permission to adopt the prefix "Royal," the Canadian organization became known as the Royal Architectural Institute of Canada (RAIC).

Over the next 80 years, architectural associations developed in all other provincial jurisdictions of the country.

The Royal Architectural Institute of Canada (RAIC)

After operating as a federation of provincial licensing organizations, the RAIC became a voluntary national professional organization in 1980. Its current vision and mission are as follows:

Vision:

To build awareness and appreciation of the contribution of architecture to the physical well-being and cultural development of Canada.

Mission:

The Royal Architectural Institute of Canada is the leading voice of architecture in Canada.

The RAIC's mission is:

- To affirm that architecture matters;
- To celebrate the richness and diversity of architecture in Canada; and
- To support architects in achieving excellence.

The role of the RAIC is to:

- act as a national forum;
- To provide practice support and leading-edge professional development for architects

- disseminate leading work in the field of architecture and architectural practice;
- encourage critique and debate;
- recognize excellence;
- facilitate communication among the professional associations and link the profession at the local level to a national and international network for information-sharing and advancement of professional issues.

The RAIC fulfils this role by running programs which span the full spectrum of design, technology transfer, and practice:

- *Publications:* the RAIC publishes technical and practice-oriented publications, newsletters, and directories including electronic publications;
- *Practice Support*: develops and maintains standard forms of contract for architectural services and updates and publishes the *Canadian Handbook of Practice for Architects*;
- *Symposia:* the RAIC organizes national roundtables and regional events;
- *Lobbying:* the RAIC lobbies the federal government and other client groups to protect the professional interests of all architects in Canada;
- *International Relationships:* the RAIC develops relationships with U.S. and Mexican architectural associations to enable members to take fuller advantage of NAFTA; the RAIC is the Canadian member section within the International Union of Architects or Union internationale des architectes (UIA); and, the RAIC shares information with other international architectural associations and facilitates discussion on mutual recognition with various multi-lateral organizations;
- *Festival of Architecture:* the RAIC organizes the annual Festival of Architecture which provides professional development courses and a forum for architectural issues and promotes public awareness of architecture;
- *Member services*: the RAIC provides discounts on professional publications and tools, professional tours, and a website for posting jobs and résumés;
- *Awards:* the RAIC recognizes excellence within the profession through the Governor General's Medals in Architecture, the RAIC Gold Medal, the Allied Arts Medal, and the RAIC Awards of Excellence and other awards;
- *Career Development:* the RAIC encourages the next generation of architects through the RAIC Student Medals, the RAIC Honour Roll, and the RAIC Syllabus Program.

The RAIC College of Fellows

The mission of the RAIC College of Fellows, founded in 1941, is to strengthen and reinforce efforts of the Institute in its endeavour to enhance and develop the profession of architecture.

The College of Fellows formally recognizes members and distinguished laypersons who have made outstanding contributions to the profession. Fellowship in the RAIC is an honour conferred on members singled out for their contribution to research, scholarship, public service or professional standing to the good of architecture in Canada, or elsewhere. The Investiture of Fellows, or the induction ceremony, is normally held at a convocation of the College during the RAIC's festival or conference.

The College also oversees the Institute's Honours and Awards Program.

The RAIC Foundation

The RAIC Foundation was established in 1964 as a charitable organization to receive tax-exempt financial contributions from RAIC members and the public at large. The foundation, which is a responsibility of the RAIC College of Fellows, has the following objectives:

- to promote and increase the knowledge, skill, and proficiency of the profession;
- to provide grants for research by Canadians or to undertake research in Canada in the field of architecture and in allied arts and sciences;
- to provide scholarships, bursaries, and fellowships to Canadian architects and Canadian architectural students.

Other National Organizations

The Canadian Architectural Certification Board (CACB)

Refer also to Chapter 1.1.4, *Admission to the Profession*, for a description of the composition and role of the Canadian Architectural Certification Board (CACB).

In 1976, recognizing the need for common professional standards, the registration or licensing authorities of nine provincial associations established the CACB. Its purpose was to assess and certify the academic qualifications of individuals who hold a professional degree or diploma in architecture and intend to apply for registration/licence. The Ordre des architectes du Québec joined the CACB in 1991.

The CACB now provides the following services:

- *certification* of the academic qualifications of candidates for admission to the profession;
- *accreditation* of the programs offered by the Canadian university schools of architecture.

The CACB is a not-for-profit corporation, whose members include the provincial and territorial licensing authorities, maintains an office in Ottawa.

The Canadian Council of University Schools of Architecture (CCUSA)

The Canadian Council of University Schools of Architecture (CCUSA) is a coordinating committee of the Canadian schools of architecture. It is comprised of the heads (or designates) from each of the eleven universities offering professional degrees in architecture. The CCUSA meets semi-annually to coordinate academic matters of national interest and offer a platform for collaboration and coordination among the eleven schools.

The Council Chair sits as a representative to the RAIC Board of Directors. The CCUSA also selects one of its members or former members to be Canadian Director on the Board of the Association of Collegiate Schools of Architecture. A founding partner of the Canadian Architectural Certification Board, the CCUSA makes an annual financial contribution to the CACB's operating budget and directly appoints three of its members.

Self-Regulation

Under the provision of the *Constitution Act*, the licensing and regulation of architects is carried out under provincial mandate. Architects, like other professionals (such as doctors, lawyers, accountants, engineers), are self-governing and self-regulating. The provincial and territorial legislatures or parliaments have enacted legislation or "Architects Acts" which establish associations of architects, enabling these associations to admit members. This privilege is granted in exchange for safeguarding the public.

By contrast, in some other countries, licensing is controlled by government bodies rather than by self-regulating organizations. For example, in the United States, state government agencies license and regulate professionals.

Provincial and Territorial Associations of Architects

The provincial and territorial associations of architects have been established by provincial or territorial statute.

Refer to the chart at the end of this chapter for a list of these associations. On the reverse side is a chart showing the respective enabling legislation for each association.

In this Handbook, "provincial association" is also used to refer to the Ordre des architectes du Québec (OAQ). This name and acronym have not been translated into English.

The provincial and territorial associations are governed by councils which may make regulations and/or bylaws, subject to the Lieutenant-Governor-in-Council, concerning the following matters:

- admission standards, including education, practical experience, and examination (refer to Chapter 1.1.4, *Admission to the Profession*);
- codes of conduct and ethics;
- professional standards of practice and performance;
- discipline of members for professional misconduct;
- licensing requirements, including temporary licences, Certificates of Practice;

- authority to administer a program of liability protection for the public;
- the operation of the governing council and the election of the council;
- committees and their operation;
- other matters related to the advancement of the profession and the practice of architecture.

Although the provincial and territorial licensing authorities (architectural associations) may be involved in other activities, including advocacy and promotion of the profession, their primary purpose remains the licensing of architects to ensure their competency and ability to provide proper professional services to the public.

In Québec, "The Professional Code" establishes the "Office des professions du Québec" which oversees and regulates all of the professional orders of Québec (professional associations), including the "Ordre des architectes du Québec" (OAQ).

There is a trend in Canada to separate the role of advocacy from regulation of the profession. The role of advocacy and promotion of the profession is sometimes undertaken by organizations other than the licensing authority. For example, in Québec the Association of Architects in Private Practice of Québec (AAPPQ) is an organisation independent of the Ordre des architectes du Québec (OAQ) created to promote the profession. The AAPPQ develops a fee schedule for architectural services and forms of contract for use in Québec. In Alberta, the newly created RAIC Alberta Chapter focuses on advocacy within the province and in Newfoundland the provincial government is creating two corporate bodies: Newfoundland and Labrador Architectural Licensing Board and Newfoundland and Labrador Association of Architects (NLAA). The Licensing Board will regulate the practice of architecture, whereas the Association will act as an advocate for the profession.

Reference

Canada. Industry Canada. *Sector Competitiveness Frameworks — Architecture, Part 1 — Overview and Prospects*. Ottawa, Ont.: Industry Canada, 1998.

List: Provincial and Territorial Associations of Architects

Architectural Institute of British Columbia
100-440 Cambie Street
Vancouver, BC V6B 2N5
Tel: (604) 683-8588
Fax: (604) 683-8568
E-mail: aibc@aibc.ca
www.aibc.bc.ca

Alberta Association of Architects
Duggan House Building
10515 Saskatchewan Drive
Edmonton, AB T6E 4S1
Tel: (403) 432-0224
Fax: (403) 439-1431
E-mail: info@aaa.ab.ca
www.aaa.ab.ca

Saskatchewan Association of Architects
642 Broadway Avenue, Suite 200
Saskatoon, SK S7N 1A9
Tel: (306) 242-0733
Fax: (306) 664-2598
E-mail: saa@link.ca
www.saa.sk.ca

Manitoba Association of Architects
137 Bannatyne Avenue, 2nd Floor
Winnipeg, MB R3B 0R3
Tel: (204) 925-4620
Fax: (204) 925-4624
E-mail: info@mbarchitects.org
www.mbarchitects.org

Ontario Association of Architects
111 Moatfield Drive
Toronto, ON M3B 3L6
Tel: (416) 449-6898
Fax: (416) 449-5756
E-mail: oaamail@oaa.on.ca
www.oaa.on.ca

Ordre des architectes du Québec
1825 boul. René Lévesque O.
Montréal, QC H3H 1R4
Tel: (514) 937-6168
Fax: (514) 933-0242
E-mail: info@oaq.com
www.oaq.com

Architects' Association of New Brunswick / Association des architectes du Nouveau-Brunswick
36 Maple Avenue
Sussex, NB E4E 2N5
Tel: (506) 433-5811
Fax: (506) 432-1122
E-mail: inquiries@aanb.org
www.aanb.org

Nova Scotia Association of Architects
1359 Barrington Street
Halifax, NS B3J 1Y9
Tel: (902) 423-7607
Fax: (902) 425-7024
E-mail: info@nsaa.ns.ca
www.nsaa.ns.ca

Architects Association of Prince Edward Island
P.O. Box 1766
Charlottetown, PE C1A 7N4
Tel: (902) 368-4999
www.aapei.com

Newfoundland and Labrador Association of Architects
P.O. Box 5204
St. John's, NF A1C 5V5
Tel: (709) 726-8550
Fax: (709) 726-1549
E-mail: nlaa@nf.sympatico.ca
www.newfoundlandarchitects.com

Northwest Territories Association of Architects
P.O. Box 1394
Yellowknife, NT X1A 2P1
Tel: (867) 766-4216
Fax: (867) 873-3654
E-mail: nwtaa@yk.com
www.nwtaa.ca

Vital Statistics: Provincial and Territorial Associations of Architects

Architectural Institute of British Columbia (AIBC)
Established: *1920*
Enabling Legislation: *Architects Act of British Columbia, RSBC 1997*
Number of Members: *1,199 resident, 318 non-resident*
Composition of Council: *10 members, 1 director from UBC School of Architecture or designate, 4 government appointees, 1 intern, 1 building designer, 1 interior designer and 1 architectural technologist*

Alberta Association of Architects (AAA)
Established: *1906*
Enabling Legislation: *Architects Act, RSA 1985*
Number of Members: *500 resident, 325 non-resident*
Composition of Council: *10 registered members, 1 government appointee, 1 licensed interior designer, 1 university appointee*

Saskatchewan Association of Architects (SAA)
Established: *1911*
Enabling Legislation: *The Architects Act, RSS 1996*
Number of Members: *82 resident, 119 non-resident*
Composition of Council: *8 registered members, 2 government appointees*

Manitoba Association of Architects (MAA)
Established: *1914*
Enabling Legislation: *The Architect's Act, RSM 1987*
Number of Members: 150 resident, 120 non-resident
Composition of Council: *8 registered members, 1 university and 2 government appointees and 2 interns*

Ontario Association of Architects (OAA)
Established: *1889*
Enabling Legislation: *Architects Act, RSO 1990*
Number of Members: *2,225 resident and 355 non-resident*
Composition of Council: *15 members including government appointees*

Ordre des architectes du Québec (OAQ)
Established: *1890*
Enabling Legislation: *Architects Act, RSQ 1994*
Number of Members: *2,587 resident, 202 non-resident*
Composition of Council: *13 members, 3 government appointees*

Association des architectes en pratique privé au Quebec (AAPPQ)
Established: *1977*
Number of Firms: *360*
Composition of Executive Committee: *5 members*

Architects' Association of New Brunswick (AANB)
Established: *1933*
Enabling Legislation: *An Act Respecting the Architects' Association of New Brunswick, RSNB 1987*
Number of Members: *75 resident, 106 non-resident*
Composition of Council: *7 registered members*

Nova Scotia Association of Architects (NSAA)
Established: *1932*
Enabling Legislation: *The Architects Act, RSNS 2006*
Number of Members: *153 resident, 50 non-resident*
Composition of Council: *7 licenced architects 1 university appointee*

Architects Association of Prince Edward Island (AAPEI)
Established: *1988*
Enabling Legislation: *Architects Act, RSPEI 1990*
Number of Members: *15 resident, 49 non-resident*
Composition of Council: *5 registered members*

Newfoundland and Labrador Architectural Licencing Board (NLALB)
Established: *2009*
Enabling Legislation: *Architects Act*
Number of Licence Holders: *34 resident and 26 non-resident*
Composition of Board: *5 elected NLAA members plus 2 appointed lay persons.*

Newfoundland and Labrador Association of Architects (NLAA)
Established: *1949*
Enabling Legislation: *Architects Act*
Number of Members: *Licence holders automatically become members of the NLAA*
Composition of Council: *5 members*

Northwest Territories Association of Architects (NWTAA)
Established: *2001*
Enabling Legislation: *Architects Act, SNWT 2001, c.10*
Number of Members: *20 resident, 16 non-resident*
Composition of Council: *6 registered architects and 1 public member appointed by the government*

Notes:
1. Membership numbers are for the year 2008. This information provides a comparison of the size of each association.
2. The number of members refers to registered or licensed architects, not the total number of members.

List and Vital Statistics: National Architectural Organizations

Canadian Architectural Certification Board (CACB)
1 Nicholas Street, Suite 710
Ottawa, Ontario K1N 7B7
Tel.: (613) 241-8399
Fax: (613) 241-7991
Email: info@cacb.ca
www.cacb-ccca.ca

Established: 1977

Composition of the Board:
The CACB Board has up to eleven members and consists of:

- Up to three (3) registered architects representing the licensing authorities. These individuals are appointed by the Canadian Architectural Licensing Authorities (CALA)
- Up to three (3) architectural educators appointed by the Canadian Council of University Schools of Architecture (CCUSA).
- Up to three (3) registered architects representing the practice and teaching of architecture appointed jointly by CCUSA and CALA.
- Up to two (2) students representing the Canadian Architecture Students Association (CASA) or its successor.

The board elects a president annually.

Royal Architectural Institute of Canada (RAIC)
55 Murray Street, Suite 330
Ottawa, Ontario K1N 5M3
Tel: (613) 241-3600
Fax: (613) 241-5750
www.raic.org

Established: *1907*
Number of Members: *3,800 members in 2008*

Composition of Board:
12 representatives:

- the president;
- The first vice-president and president elect;
- 7 regional directors;
- the chancellor of the College of Fellows;
- the chair of the CCUSA;
- the past-president.

The president is elected annually from the board of directors by the board.

Charts: Comparison of Practice Requirements of Each Provincial or Territorial Association

The following comparisons contain excerpts from provincial and territorial Architects Acts. Please refer to the full text for a complete understanding of the legislation.

5A: Comparison of Provincial Requirements regarding the RIGHT or AUTHORITY to Practise Architecture
5B: Comparison of Provincial Requirements regarding PROFESSIONAL LIABILITY INSURANCE
5C: Comparison of Provincial Requirements regarding PARTNERSHIPS
5D: Comparison of Provincial Requirements regarding the OWNERSHIP and STRUCTURE OF CORPORATIONS which Practise Architecture
5E: Comparison of Provincial Requirements for the NAME of an Architectural Practice
5F: Comparison of Provincial Requirements/Guidelines regarding the APPLICATION of SEALS

Chart 5A: Comparison of Provincial or Territorial Requirements regarding the RIGHT or AUTHORITY to Practise Architecture

The following comparisons contain excerpts from provincial architects acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirement to Practise Architecture
AIBC	registration and *Certificate of Practice;* registration of practices
AAA	registration and *Annual Certificate*
SAA	registration and *Licence to Practice Architecture*
MAA	registration of firm for all architectural partnerships, groups of members, or sole proprietors; and *Certificate of Approval* for architectural corporations and joint A/E firms and corporations [Note: Certificate of Authorization from the Professional Engineers of Manitoba is also required for joint A/E firms and corporations]
OAA	licence and Certificate of Practice [Note: Certificate of Authorization is required from the Professional Engineers of Ontario if practice is providing engineering services]
OAQ	registration
AANB	registration and *Certificate of Practice*
NSAA	registration: Corporate Permit (for Partnerships and Corporations)
AAPEI	registration and *Certificate of Practice*
NLALB	registration, and for partnerships or corporations only, a *Certificate of Approval*
NWTAA	registration, and *Certificate to Practice*; registration of firm and *Permit to Practice*

Chart 5B: Comparison of Provincial or Territorial Requirements regarding PROFESSIONAL LIABILITY INSURANCE

The following comparisons contain excerpts from provincial or territorial Architects Acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirement for Professional Liability Insurance
AIBC	• *recommends* coverage of $250,000 per claim and $500,000 annual aggregate • Certificate of Practice holder must notify client in writing whether or not professional liability insurance is held and under what terms (Bulletin 66)
AAA	• no current requirement
SAA	• no current requirement
MAA	• corporations and joint A/E firms and corporations must have minimum coverage of $250,000 • Act permits establishment of a Professional Liability Claims Fund (none established to date)
OAA	• mandatory Professional Liability Insurance for all Certificates of Practice through ProDemnity Insurance Company if office is in Ontario; otherwise, proof of PL coverage to same limits • minimum coverage $250,000 per claim
OAQ	• all architects having their own practice must contribute to the professional liability insurance fund of the OAQ (Fonds d'assurance de la responsabilité professionnelle) • minimum coverage $1,000,000 per claim (annual aggregate $2,000,000)
AANB	• Mandatory professional liability insurance coverage for all Certificate of Practice holders. Minimum coverage - $250,000 per claim ($500,000 aggregate)
NSAA	• Mandatory professional liability insurance coverage of at least $250,000 per claim, with aggregate coverage of at least $500,000.
AAPEI	• no current requirement
NLALB	• all resident and non-resident Certificates of Approval require professional liability insurance
NWTAA	• no current requirement

Chart 5C: Comparison of Provincial or Territorial Requirements regarding PARTNERSHIPS

The following comparisons contain excerpts from provincial and territorial architects acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirement for Partnerships
AIBC	65. (1) A member, architectural firm or licensee must not practise architecture in partnership with a person not entitled to practise architecture, or make an agreement or arrangement or do an act that will enable the person to practise architecture contrary to this Act. (2) A person registered or licensed under this Act may enter into a partnership with a professional engineer registered under the laws of British Columbia for the practice of the person's profession. *(Architects Act)*
AAA	33(1) A registered architect may practise architecture as a partner in a partnership only if the partnership meets all of the following requirements: (a) one or more registered architects or architects corporations hold (i) more than 50% of the interest in the partnership, or (ii) not less than 50% of the interest in the partnership, if the remainder of the interest in the partnership is held by licensed interior designers or professional engineers, or both; (b) the partners in the partnership who are not authorized entities (i) do not engage in the practice of architecture; (ii) are of good character, and (iii) are satisfactory to the Council. 33(3) Subject to section 3 of the Act and notwithstanding subsection (1), a registered architect may enter into a partnership with one or more engineers or engineers firms, as those terms are defined in Section 17 of the Act.
SAA	13.01 Where a firm other than a corporation is constituted for the practice of architecture the majority of the principals of the firm must be members of the Association. *(Bylaws)* "firm" means a person or body that carries on the practice of architecture and includes an architect, a partnership and a licensed corporation (Bylaws – 1.01.5); "partnership" means an association of authorized entities or authorized entities and other persons that carry on the practice of architecture, whether on a full-time, part-time or limited basis (Bylaws – 1.01.6).
MAA	15(1) No person or firm is entitled to practise as an architect in Manitoba, or to take or use in Manitoba the designation "architect" or "architects", either alone or in combination with any other words or any name, title, or description, implying that he or they is or are an architect or architects unless the person or each member of the firm is a member of the association in good standing and registered as such. *(Architects Act)* 16(1) Despite subsections 15(1) and 25(2) a corporation or firm that does not meet the requirements of subsection 15(1) or 15(2) may practise architecture in its own name, and may use the designation "architect", "architects" or other words implying that it is practising architecture, if (a) the corporation or firm holds a valid certificate of approval; (b) the professional liability insurance or alternative coverage of its practice of architecture meets the requirements prescribed by the council; and (c) its practice of architecture is carried on by or under the direct personal supervision of one or more registered architects who have professional responsibility for the practice and are shareholders, members or permanent employees of the corporation or firm. *(Architects Act)*

Provincial Association	Requirement for Partnerships
MAA	13.6 (2) An application for a Certificate of Approval allowing a Joint Architectural and Engineering Firm to practice architecture shall be made to Council, in the form approved by Council. The application shall be accompanied by the following: (a) evidence, satisfactory to Council, that the practice of architecture will be carried on by or under the direct personal supervision, and will be the responsibility of, one or more permanent employees or partners who are Registered Members; (b) evidence, satisfactory to Council, that all of the partners of the Firm are: (i) Professional Engineers; or (ii) Professional Engineers and Registered Members; (c) evidence, satisfactory to Council, that the primary and customary business of the Firm will be both the practice of architecture and the practice of professional engineering; (d) evidence, satisfactory to Council, that the Joint Architectural and Engineering Firm has professional liability insurance in such minimum amounts and containing such terms and conditions as may be prescribed from time to time by Council; (e) evidence, satisfactory to Council, that the Joint Architectural and Engineering Firm holds a Certificate of Authorization from the Association of Professional Engineers and Geoscientists of the Province of Manitoba. *(By-Laws)*
OAA	15(1) The Registrar shall issue a certificate of practice to a partnership of members of the Association that applies thereof in accordance with the regulations and that proposes to engage in or hold itself out as engaging in the practice of architecture. (2) The Registrar shall issue a certificate of practice to a partnership of members of the Association of Professional Engineers of Ontario that applies thereof in accordance with the regulations and that, (a) holds a certificate of authorization; and (b) employs at least one member of the Association who will personally supervise and direct the practice of architecture by the partnership. (3) The Registrar shall issue a certificate of practice to a partnership of one or more members of the Ontario Association of Architects and one or more members of the Association of Professional Engineers of Ontario that holds a general certificate of authorization and that applies in accordance with the regulations and that proposes to engage in or hold itself out as engaging in the practice of architecture. *(Architects Act)*
OAQ	A "partnership of architects" is the only recognized partnership in Québec
AANB	13(3) Members or licensees may practice architecture in a name other than their own and conduct their business as a partnership with members, licensees, engineers or other individuals, or with corporations meeting the requirements of paragraphs 13(4) (a) and (c) if (a) at least two thirds of the partners who are individuals are architects or engineers and at least one of whom is an architect; (b) one of the principal and customary functions of the partnership is the practice of architecture; (c) the practice of architecture is carried out under the responsibility and supervision of an architect who is a partner, an employee of the partnership or an officer, director or employee of a corporate partner; and (d) the partnership holds a valid Certificate of Practice. *(Architects Act)*
NSAA	22(1) A person must not enter into partnership to practise architecture with any person who is not a licensed architect, unless the other person is a person authorized to practise or to apply engineering under the Engineering Profession Act, or a person referred to in subsection (2). (2) A person who is not a licensed architect but who, on February 1, 1968, was a member of a partnership engaged in the practice of architecture and duly registered under the Partnerships and Business Names Registration Act may continue to be a partner in that partnership until the dissolution of the partnership, or may enter into partnership with any of the licensed architects with whom they may become associated, but the person is not entitled to practise architecture unless that person holds a licence or is acting under the responsible control of a licensed architect.

Provincial Association	Requirement for Partnerships
AAPEI	(3) Members or licensees may practise architecture in a name other than their own and conduct business as a partnership with other members, licensees or other individuals, or with corporations meeting the requirements of clauses (4) (a) and (c) if (a) at least one of the individual partners is an architect having an interest in the partnership of not less than that of any other individual or corporate partner; (b) one of the principal and customary functions of the partnership is the practice of architecture; (c) the practice of architecture is carried out under the responsibility and supervision of an architect who is a partner, or an officer or director of a corporate partner; and (d) the partnership holds a valid certificate of practice. *(Architects Act)*
NLALB	24 (1) The Council shall issue a Certificate of Approval to a resident partnership or firm where Council is satisfied in writing that (a) one of the principal and customary functions of the partnership or firm is to practise architecture; (b) the practise of architecture is the responsibility of, and is carried out under the supervision of, a partner in the partnership, or a principal of the firm who is registered or licensed to practise architecture in the province; and (c) two-thirds of the partners of the partnership or two-thirds of the principals of the firm are qualified to practise in the design professions. Note: *"Design profession"* includes the professional practice of architecture or engineering, landscape architecture, town planning, environment planning, interior design and related professions but does not include the practice of drafting. *(Architects Act)*
NWTAA	"firm" includes a partnership, corporation or association of persons.

Chart 5D: Comparison of Provincial or Territorial Requirements regarding the OWNERSHIP and STRUCTURE OF CORPORATIONS which Practise Architecture

The following comparisons contain excerpts from provincial architects acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	REQUIREMENTS FOR CORPORATIONS which practise architecture
AIBC	• incorporated under the *Company Act* and in good standing, • **majority** of each class of voting shares is legally and beneficially owned by architects, • **majority of directors** are architects, • **CEO is an architect,** • all persons practising on behalf of corporation are under direct supervision of an architect who is a continuing employee or shareholder, • corporations of engineers and architects also permitted (similar rules apply), • transfer of voting rights to non-architects not permitted if majority control would be altered, • Certificate of Practice required *(Architects Act)*
AAA	• the Articles of Incorporation must be approved by Council and must contain 5 required clauses (see Section 10 of the General Regulation); • the name of the corporation must meet the established requirements (see section 27 of the General Regulation) • the corporation must have one or more full-time permanent employees or shareholders who are registered architects who will assume direct personal supervision, direction and control of the practice of architecture in which the corporation proposes to engage; • the beneficial ownership of more than 50% of the corporations voting shares must be vested in one or more registered architects, one or more architect-held corporations, or a combination of registered architects and architect-held corporations; • if the beneficial ownership includes interior designer and/or engineers then 50% of the voting shares must be held by one or more registered architects; • a majority of the directors and officers of the corporation must be registered architects • any shareholders of the corporation who are not registered architects, licensed interior designers or professional engineers must be of good character and satisfactory to the Council; *(Architects Act General Regulation Section 10-12)*
SAA	A corporation shall only be granted a license to practice architecture and shall only retain such license where: .1 one of its principal and customary functions is to practice architecture and the practice is to be conducted under the supervision of a member or members of the Association who is or are employed by the corporation and who individually assume the function of and are responsible as members for architectural services performed, notwithstanding their employment with the corporation; .2 the personal seal or stamp of a member or members of the Association and not the seal of the corporation must be used to stamp any required drawings; .3 the name of the corporation shall not be worded in such a manner that it might mislead the public; .4 the provisions of all incorporating documents (whether Memorandum of Association, Articles of Association, Letters Patent or Articles of Incorporation) and bylaws of the corporation and any alterations or amendments thereto are filed with and approved by council; .5 one of the directors must be a member of the Association; .6 the control of the corporation shall be vested in members of the Association and, without limiting the generality of the foregoing, at least 51% of the voting shares of the corporation shall be beneficially and absolutely held by members of the Association; and .7 a member shall not enter into any agreement transferring voting rights in the member's shares in the corporation to a person who is not a member. *(Bylaw - 12.01)* The corporation shall file with council any and all proposed alterations or amendments to its incorporating documents or bylaws or to its corporate structure, including any unanimous shareholder agreement pertaining thereto, and shall obtain the approval of council thereto before effecting any such change. (12.02) The corporation shall at all times be maintained in good standing with the Director of Corporations and shall, once every year, file with the council a certified copy of the annual return required to be filed with the Director of Corporations. (12.03)

Provincial Association	REQUIREMENTS FOR CORPORATIONS which practise architecture
SAA	Notwithstanding anything herein above contained, the council may reject or revoke any application for a license to practice architecture or a renewal thereof where the corporation has failed to comply with or has subsequently violated any provisions of this bylaw or if the corporation has been guilty of conduct which, in the sole judgment of the council, is inimical to the best interest of the public or the profession of architecture in Saskatchewan. (12.04) Where a corporation is but a partner in a firm, whether with other corporationsor with individuals, the provisions of this bylaw shall apply to such corporation. (12.05) A corporation shall have its license to practice architecture suspended or revoked where any member of the Association who is a director or shareholder of the corporation has been suspended from membership in the Association or whose membership has been revoked under sections 28, 29, 30 or 31 of the Act; provided that council may, at its discretion, continue or reinstate the license of the corporation upon such terms and conditions as the council sees fit. (12.06)
MAA	• practice is under direct supervision and control of a permanent employee or shareholder who is a registered member, • **majority** of voting shares are owned by registered members of the MAA and/or APEGM, • **majority of directors** are registered members of the MAA and/or APEGM, • **at least one officer** is a registered member, • primary and customary business is the practice of architecture or the practice of engineering and architecture, • liability insurance in minimum amounts and under terms and conditions as prescribed by Council, • corporation has a Certificate of Practice from the association (and joint A/E corporation must also hold a Certificate of Authorization from APEGM), • Certificate of Approval required/Corporation or Joint A/E Corporation stamp issued. *(Architects Act and By-Laws)*
OAA	• **majority of directors** are members of OAA or members of Professional Engineers of Ontario • **majority of each class of shares** owned by members of OAA or PEO, • non-architects owning shares must be full-time employees, • primary function is to engage in practice of architecture, • one director or full-time employee must be a member who will personally supervise and direct the practice of architecture, • **no person** (**non-architect** or non-engineer) may **own**, directly or indirectly, or exercise control or direction, or beneficially own, directly or indirectly, shares of any class together with another shareholder or other shareholders exercise control over **more than 49%** of any class of shares; • joint shares between member and non-member are deemed to be owned by a non-member, • "associated with another shareholder" means: • one shareholder is a corporation of which the other shareholder is an officer or director, • one shareholder is a partnership of which the other shareholder is a partner, • one shareholder is a corporation controlled directly or indirectly by the other shareholder, • both shareholders are corporations controlled by the same individual that controls the other shareholder, • both shareholders are members of a voting trust relating to the shares of a corporation, • control means 50% of shares are held for the benefit of one person or corporation. *(Architects Act 14 & 21)*
OAQ	In Québec, the Ordre des architectes du Québec (OAQ) is in the process of changing its regulations to permit architects to incorporate. As of 2009, a company cannot practice architecture; only individuals, partnerships or consortia can practise architecture.
AANB	• one of the principal functions of the corporation or of each corporate partner is the practice of architecture, • the practice of architecture is carried out under the responsibility and supervision of a director, officer or employee who is an architect, • at least **two-thirds of the directors** of the corporation or of each corporate partner are architects or engineers and at least one of whom, for each corporation, is an architect, and the **majority of** the issued **shares** of each class of voting shares are beneficially owned by and registered in the name of the architects and engineers, • Certificate of Practice required. *(Architects Act)*

Provincial Association	REQUIREMENTS FOR CORPORATIONS which practise architecture
NSAA	23. The majority of the issued voting shares of the corporate entity, representing voting control of the corporate entity, are beneficially owned by 1 or more licensed architects; • a majority of the directors and officers of the corporate entity are licensed architects; • any person who practises architecture on behalf of the corporate entity is a licensed architect; Corporate Permit required (2) Issued voting shares of a corporate entity may be legally and beneficially owned by another corporate entity, if (a) all of the issued voting shares of the other corporate entity are legally and beneficially owned by one or more licensed architects, or a by a trust of which each of the trustees and beneficiaries is a licensed architect; and (b) the majority of the officers and directors are licensed architects.
AAPEI	• one of the principal and customary functions of the corporation or each corporate partner is the practice of architecture, • practice of architecture carried out under the responsibility and supervision of a director, officer or employee who is an architect, • **at least one director** and **each corporate partner** is an architect and is the beneficial and registered owner of **no fewer** of each class of voting shares **than the number of such shares held by any other shareholder** or director, • Certificate of Practice required. NON-RESIDENT Corporations • **two-thirds** of the partners, principals or **directors** must be architects, • **majority** of issued **shares** of each class of voting shares beneficially owned and registered in the name of architects. *(Architects Act)*
NLALB	• one of principal and customary functions is the practice of architecture,, • practice of architecture carried out under the supervision of a **director** who is **registered** in the province, • **two-thirds** or more of **directors** qualified to practise in **a design profession**, if corporation has three or more directors, if less than three directors at least **one** must be an **architect**, • not less than **51%** of shares beneficially owned and registered in the name of directors in the design professions as above, or 100% of shares are beneficially owned by architects registered in the province. NON-RESIDENT Corporations • each director who is an architect must be registered in the province. *(Architects Act)*
NWTAA	"firm" includes a partnership, corporation or association of persons. 29. (1) Subject to subsection (2), the council shall approve the issuance of a permit to a firm that (a) applies in accordance with the bylaws; (b) pays the application fees required by the bylaws; and (c) has at least one director, partner or officer of the firm who (i) is an architect, restricted practitioner, or licensee, (ii) will serve as the professional representative of the firm, and (iii) will directly supervise the practice of architecture by, and the professional conduct of, the firm. (2) The council may not approve the issuance of a permit to a firm that is a corporation unless (a) it is incorporated, continued or registered under the Business Corporations Act and has filed with the Registrar of Corporations all documents required to be filed under that Act; (b) at least one of the directors of the corporation complies with the requirements in paragraph (1)(c); and (c) a function of the corporation is to engage in the practice of architecture. Extra-Territorial Corporation (3) The council shall approve the issuance of a permit to a firm incorporated or formed under the laws of another jurisdiction if the firm (a) is licensed or authorized to practice architecture by that jurisdiction; and (b) complies with the requirements in paragraphs (1)(a) to (c). *(Architects Act)*

Chart 5E: Comparison of Provincial or Territorial Requirements regarding the NAME of an Architectural Practice

The following comparisons contain excerpts from provincial or territorial Architects Acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirements/Restrictions for the NAME of an Architectural Practice
AIBC	No architectural firm shall use a name which is misleading or unprofessional and all architectural firm names shall be subject to approval by Council. *(Bylaw 15.1)*
AAA	• a firm name must contain the word "architect", "architects", "architectural", or "architecture" but cannot use the plural unless more than one registered architect works with the firm as a partner or shareholder; • the name cannot be self-laudatory or misleading; • if the names of one or more individuals are included in the name of the firm then the names may only be of architects, licensed interior designers, or engineers who are partners or shareholders. At least one of the names must be the name of a registered architect who is a partner or shareholder in the firm; • the name or a retired or deceased registered architect may be used in the name of a firm upon the conditions set out in Section 27(4) of the General Regulation; • all names require the approval of Council *Architects Act General Regulation Section 27.* *See also Sections 29-31 regarding Letterhead and Business Card requirements*
SAA	The name of the ***corporation*** shall not be worded in such a manner that might mislead the public (Bylaw – 12.01.3); The name of the ***firm*** shall not be worded in such a manner that it might mislead the public (Bylaw - 13.02). The name of an architectural firm ***must include the word "architect" or an acceptable derivative*** (architects, architecture, architectural) as is appropriate (Practice Bulletin).
MAA	15.4 a) No Sole Proprietorship, Architectural Firm, Architectural Corporation or Partnership of Architectural Corporations shall carry on, in any way, business under a name or style that: 15.5 i) is the same or similar to a name being used by a Registered Member, Firm or Corporation Sole Proprietorship, Architectural Firm, Architectural Corporation or Partnership of Architectural Corporations that engages in the practice of architecture so that its use would, in the opinion of Council, be likely to deceive or confuse the public; ii) is otherwise misleading; iii) is scandalous, obscene or immoral; or iv) indicates a superior level of practice, a special level of expertise, or compares abilities, either expressly or by implication with other Sole Proprietorships, Architectural Firms, Architectural Corporations or Partnerships of Architectural Corporations. b) The name or style under which a Sole Proprietorship, Architectural Firm, Architectural Corporation or Partnership of Architectural Corporations carries on the practice of architecture shall include the word "architect" or an abbreviation, derivation or variation thereof approved by Council. c) The letterhead used by a Sole Proprietorship, Architectural Firm, Architectural Corporation or Partnership of Architectural Corporations must indicate, either in the Firm or Corporation name, or elsewhere on the letterhead, the names of all Registered Members, and if applicable the names of all Corporations, who are: i) partners in the Firm, and/or ii) Directors of the Corporation. d) The name and a copy of the letterhead to be used by a Sole Proprietorship, Architectural Firm, Architectural Corporation or Partnership of Architectural Corporations in the practice of architecture shall be submitted to Council for approval prior to the Sole Proprietorship, Architectural Firm, Architectural Corporation or Partnership of Architectural Corporations being entitled to practice architecture. 15.6 a) No Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation shall carry on, in any way, business under a name or style that: i) is the same of is similar to a name being used by a Sole Proprietorship, Architectural Firm, Architectural Corporation, Partnership of Architectural Corporations, Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation, that engages in the practice of architecture or the practice of architecture and the practice of professional engineering, as the case may be, so that its use would, in the opinion of Council, be likely to deceive or confuse the public; ii) is otherwise misleading; iii) is scandalous, obscene or immoral; or iv) indicates a superior level of practice, a special level of expertise, or compares abilities, either expressly or by implication, with any Sole Proprietorships, Architectural Firms, Architectural Corporations, Partnerships of Architectural Corporations, Joint Architectural and Engineering Firms or Joint Architectural and Engineering Corporations b) The name of style under which a Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation carries on the practice of architecture may include the word "architect" or an abbreviation, c) The letterhead used by a Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation must indicate, either in the Firm or Corporation name, or elsewhere on the letterhead, the name of: i) all Professional Engineers, and if applicable all Registered Members, who are partners in the Firm or Directors of the Corporation; and ii) the Registered Members who will be professionally responsible for the practice of architecture by the Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation. *(Bylaws)*

Provincial Association	Requirements/Restrictions for the NAME of an Architectural Practice
OAA	No holder of a certificate of practice, a certificate of practice issued under section 23 of the Act or a temporary licence shall use a name designation or letterhead that is, a) the same as or similar to the name of a sole proprietorship, partnership, corporation or joint venture that engages in the practice of architecture in Ontario so that its use would be likely to deceive; b) a number name. c) in the case of a corporation that does not have a number name, a name other than the name of the corporation; d) otherwise misleading; e) scandalous, obscene or immoral; or f) self-laudatory.
OAQ	5.03.02 The name of a partnership of architects shall include the names of the members of the Order who practise together. 5.03.03 When an architect withdraws from a partnership, his name must be removed from the partnership name except in the cases provided for in section 5.03.04. 5.03.04 When an architect withdraws from a partnership to practise alone, to join another partnership or to perform duties that are incompatible with the practice of his profession, his name must be removed from the partnership name within 6 months from his withdrawal, unless there is an agreement to the contrary. 5.03.05 Notwithstanding section 5.03.02, a partnership of architects may retain in its name the name of a deceased or retired architect for 1 year following the death or retirement, provided that the architect was a member of the partnership at the time of his death or retirement. 5.03.06 Notwithstanding section 5.03.05, the name of a partnership of architects may include the name of a deceased or retired architect provided that the architect was a member of that partnership during the 5 years preceding his death or retirement and provided that the architect, his heirs or his successors have concluded an agreement to that effect. Such agreement may be revoked for cause. *(Regulations)*
AANB	6.5.1 A holder of a Certificate of Practice shall not use a name, designation or letterhead that is a) the same as or similar to the name, designation or letterhead of a sole proprietorship, partnership, corporation or joint venture that engages in the practice of architecture in New Brunswick so that the use would be likely to deceive or confuse; b) a number name of a corporation; c) a name other than the name of the corporation; d) misleading; e) scandalous, obscene or immoral; or f) self-laudatory. 6.5.2 Styling of firm, company or corporate names and the composition of letterheads of persons applying for a Certificate of Practice shall be approved by Council. 6.5.3 Names and designations for firms or corporate names shall comply with the following: a) anonymous designations are in general acceptable. A name or designation may include the name, names or initials of a past or present member. The name, names or initials of past or present members of the Association of Professional Engineers of New Brunswick may be included; b) Firm names or designations shall not include the name or initials of individuals other than as authorized in subsection 6.5.3 (a); and c) Firm names or designations may use the word "Architect", or any addition, abbreviation, derivation or variation thereof, and also the term "partner(s)", "associate(s)", "and associate(s)" or "partnership" if associates or partners in fact exist. The term "associate" or "partner" in this context means another member of the design professions. d) The design professions in this context shall include persons duly qualified in the fields of landscape architecture, community planning and interior design, but does not include technicians or technologists. Any dispute as to the meaning or eligibility shall be referred to Council, whose decision shall be final. *(Bylaws)*
NSAA	No regulation regarding selection of name.
AAPEI	14 (2)Members or licensees may practise architecture in a name other than their own and conduct their business as a proprietorship if… (3)Members or licensees may practise architecture in a name other than their own and conduct their business as a partnership with other members, licensees or other individuals, or with corporations meeting the requirements of clauses (4)(a) and (c) if… . (4)A corporation may practise architecture in its own name or in partnership with a member, licensee or other corporation if… *(Architects Act)*
NLALB	C.1 (a) Styling of Firm or company names and composition of letterhead shall not be such as to be misleading to the general public, and shall comply with the following requirements: 1) Any proper names appearing in the Firm Title shall be those of the constituent members of the firm. Professional designation of each constituent member must also be included in the composition of the letterhead. 2) Anonymous designations may be used for Firm or Company names in strict compliance with the Architect's Act, provided that the principals of the Firm or Company and their designation are listed on the Firm or Company letterhead. 3) No designation shall be used which refers to the plural term (Architects, Engineers, etc.) or Associates, Partners, etc., when such do not exist. 4) The Firm name or letterhead shall not incorporate any words which would imply that offices are maintained in any other City, Province or Country when such is in fact not the case. 5) Firm titles or letterheads shall not incorporate any wording which would mislead potential clients. *(Code of Professional Conduct)*
NWTAA	no regulation regarding the name of an architectural practice

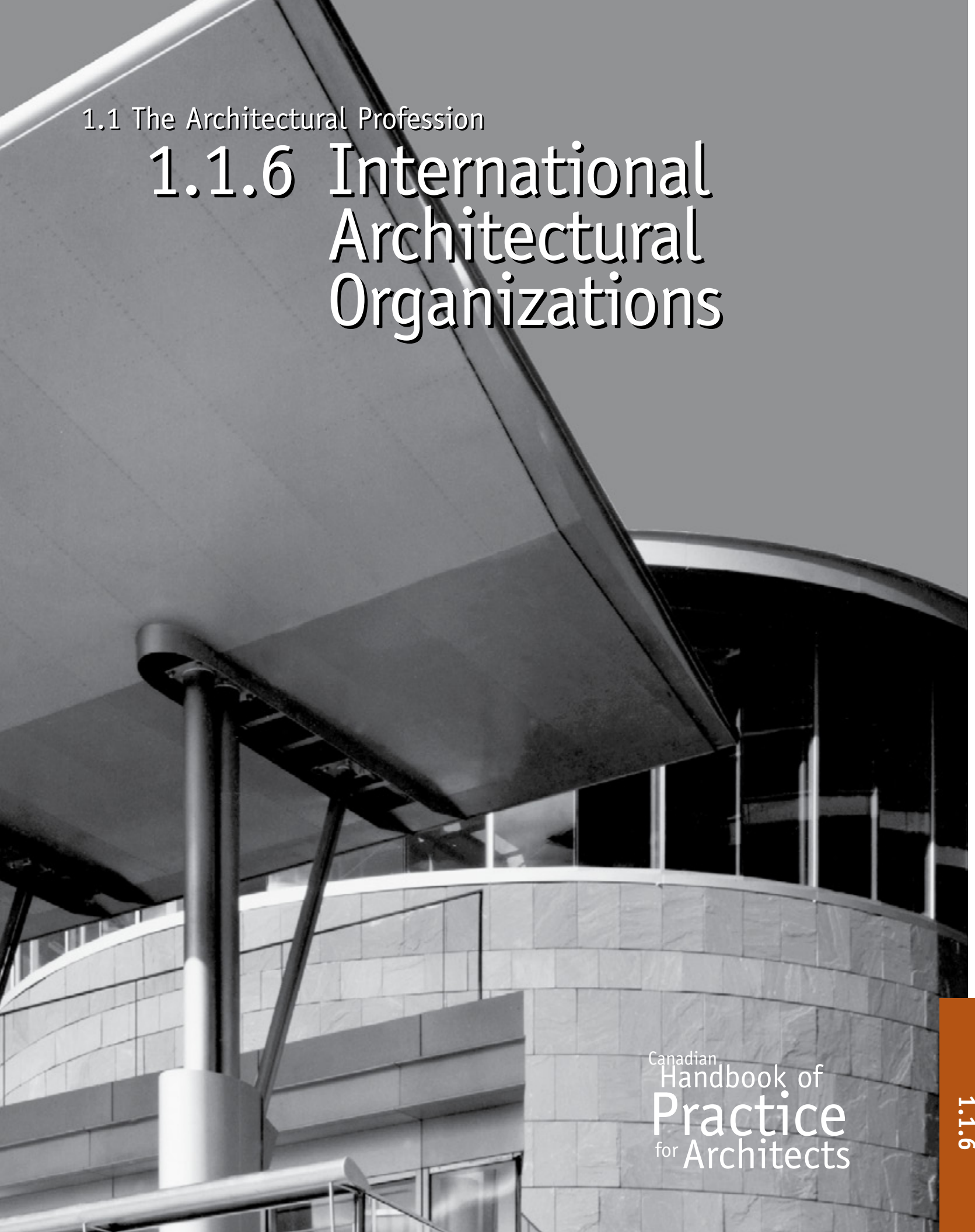
Chart 5F: Comparison of Provincial or Territorial Requirements/ Guidelines regarding the APPLICATION of SEALS

The following comparisons contain excerpts from provincial or territorial Architects Acts and rules. Please refer to the full text for a complete understanding of the legislation.

Provincial Association	Requirements or Guidelines re: SEALS
AIBC	77 (1) An architect must apply a seal, with signature and date, to letters of assurance, certificates, drawings and specifications prepared by or under the architect's supervision, direction or control if the architect practises architecture… 78 A member of the institute or a licensee must not affix his or her seal to a plan, working drawing, detail drawing, specification or other document unless it was prepared under the supervision, direction or control of the member or licensee. *(Architects Act)*
AAA	2 (2) No person except a registered architect, visiting project architect, architects corporation or architects and engineers firm shall … (c) affix a seal or a stamp of a registered architect or the stamp of a visiting project architect, architects corporation or architects and engineers firm, or permit that seal or stamp to be fixed, to a plan, drawing, detail drawing, specification, or other document or a reproduction of any of them unless (i) that plan, drawing, detail drawing, specification or other document or reproduction was prepared by or under the personal supervision, direction and control of, and (ii) the seal or stamp is affixed with the knowledge, consent and in accordance with the direction of the registered architect or visiting project architect to whom or the architects corporation or architects and engineers firm to which the seal or stamp was issued by the Registrar. *(Architects Act)*
SAA	2.02 Every member shall have a seal, supplied by the Association, the impression of which shall contain the name of the member, the member's registration number and place of business, and the words "Registered Architect, Saskatchewan" and the name of the Association. .1 The seal when affixed to drawings, shall bear the member's signature and the date. .2 The seal is the property of the Association. If a person ceases to be a member of the Association, their seal shall be promptly delivered to the office of the Association. If the member is reinstated, the seal shall be returned to the member. .3 The practice of electronic sealing is recognized, and regulations in this bylaw shall apply to it accordingly, modified as needed to accommodate the changed format. *(Bylaws)*
MAA	11.4 (b) All working drawings, specifications and the certificates involved in the practice of architecture when issued shall bear the seal and signature of the Registered Member responsible for the design as well as the date on which the seal and signature were affixed. (c) Whenever a Registered Member uses his/her seal, his/her signature shall appear across the seal. In the case where there is more than one name on the seal, at least one of the Registered Members named there-on shall sign the seal. 11.5 (b) All working drawings, specifications and certificates involved in the practice of architecture which are prepared by, through or on behalf of an Architectural Corporation, Partnership of Architectural Corporations, Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation, shall bear the seal and signature of the Registered Member responsible for the design and the stamp of the Architectural Corporation or Partnership of Corporations, Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation, as well as the date on which the stamp, seal and signature were affixed. (c) Whenever a an Architectural Corporation, Partnership of Architectural Corporations, Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation uses its stamp, the signature of the Registered Member responsible for the design shall appear across the stamp of the Architectural Corporation, Partnership of Corporations, Joint Architectural and Engineering Firm or Joint Architectural and Engineering Corporation. *(Bylaws)* • Seals are required on working drawings, specifications, and certificates. • Also, seals are required on reports prepared by Corporations.
OAA	The seal and signature must be applied to "every design prepared under his or her personal supervision and direction and issued or exhibited to a person who is not a holder and is submitted as part of an application for a building permit or is used for the construction, enlargement or alteration of a building, except in the case of an open competition in which anonymity is a requirement" *(Regulation 27, 42(21))**

Provincial Association	Requirements or Guidelines re: SEALS
OAQ	An architect must identify by means of his signature and seal all plans, preliminary or working specifications, work supervision reports, payment certificates, change orders, work completion certificates and experts' reports, prepared for architectural work by himself or under his immediate control and supervision. *(Regulation respecting the Code of Ethics 3.04.01)*
AANB	15(3) Unless exempted by by-law, every member or licensee practising architecture in New Brunswick in his own name shall sign, date and affix his stamp to all designs, specifications, reports, contracts and other documents pertaining to the practice of architecture which have been prepared by the member or licensee, or under the direct supervision of the member or licensee. 15(5) Every person authorized to practice architecture under this Act who fails to sign and affix their stamp to a final construction document, as required by this section, is guilty of professional misconduct. *(Architects Act)*
NSAA	32 Every licensed architect must have a seal of a design authorized by the regulations, and shall bear the name of the licensed architect and the words "licensed architect, Nova Scotia Association of Architects". 33 All technical submissions prepared by a licensed architect, or under the architect's responsible control, shall be sealed with the seal of the licensed architect and signed by the licensed architect, signifying that the licensed architect was in responsible control of the content of the technical submissions and has applied the required standard of care. 34 No licensed architect may sign or seal technical submissions unless prepared by or under the responsible control of the architect, except that (a) the architect may sign or seal those portions of the technical submissions that were prepared by or under the responsible control of persons who are licensed under this Act if the architect has reviewed and adopted in whole or in part such portions and has either co-ordinated their preparation or integrated them into the architect's work; and (b) the architect may sign or seal those portions of the technical submissions that are not required by this Act to be prepared by or under the responsible control of an architect if the architect has reviewed and adopted in whole or in part such submissions and integrated them into the architect's own work. 35 Any licensed architect signing or sealing technical submissions not prepared by that architect, but prepared under that architect's responsible control by persons not regularly employed in the office where the architect is resident, shall maintain and make available to the Board upon request for at least five years following such signing and sealing, adequate and complete records demonstrating the nature and extent of the architect's control over and detailed knowledge of such technical submissions throughout their preparation.
AAPEI	16. (3) Every member or licensee practising architecture in Prince Edward Island in his own name shall sign and affix his stamp to all final designs or construction documents which have been prepared by such person or under the supervision of such person. (4) Every proprietorship, partnership or corporation practising architecture in Prince Edward Island shall affix its stamp to all designs which have been prepared by the proprietorship, partnership or corporation, and have such designs signed by a member or licensee designated on the certificate of practice. (5) Every person authorized to practice architecture under this Act who fails to sign and affix their stamp to a final design or construction document, as required by this section, is guilty of professional misconduct. *(Architects Act)*
NLALB	33.2 (2) All final drawings, specifications, plans, reports and other documents involving the practice of architecture, when issued, shall bear the signature and seal of the architect who prepared or approved them. *(Architects Act)*
NWTAA	89.(c) The stamp shall be affixed to a document only when the professional taking responsibility is satisfied that the work has been completed to an acceptable standard. The responsible professional shall sign across the imprint of the stamp and indicate the date of the signature. 89.(g) The permit stamp shall be affixed to a document only after the professional or professionals taking responsibility have affixed their personal stamps. The officer or employee, so authorized by the Permit Holder, shall affix the stamp, sign across the imprint of the stamp and indicate the date of the signature. *(By-Laws)*

** OAA Bulletin A.1 describes the appropriate use of the Architect's professional seal including the electronic application of the seal.*



1.1.6 International Architectural Organizations

Introduction

International Organizations
- International Union of Architects (UIA)
- Architects Council of Europe (ACE)
- APEC Architect Project
- Federation of Pan-american Architects' Association or Federacion panamericana de asociaciones de arquitectos (FPAA)

North American Organizations
- The American Institute of Architects (AIA)
- National Council of Architectural Registration Boards (NCARB)
- National Architectural Accrediting Board, Inc. (NAAB)
- Association of Collegiate Schools of Architecture (ACSA)
- Federación de Colegios de Arquitectos de le República Méxicana (FCARM)
- Asociación de Instituciones de Enseñanza de la Arquitectura de la República Mexicana (ASINEA)

Reference

Chart: Comparison of Licensing Procedures for Architects in Canada, the United States, and Mexico

List: International Organizations

International Architectural Organizations

Introduction

Most nations have some form of professional or legal organization for their architects. This Handbook cannot outline them all, but will briefly describe one international body, three multilateral organizations that have relations with the architectural profession in Canada, and those organizations within North America which affect the Canadian architectural community. In the past, Canadian architects were closely affiliated with Britain and the Commonwealth, and many were members of the Royal Institute of British Architects (RIBA). Today, however, most architects in Canada have closer ties with their colleagues in North America and often provide services worldwide.

International Organizations

International Union of Architects (UIA)
www.uia-architectes.org

The International Union of Architects, or Union internationale des architectes (UIA), was founded in 1948 in Lausanne, Switzerland, as a federation of professional societies from several countries. From the 27 delegations present at the founding assembly, the UIA has grown to encompass the key professional organisations of architects in 116 countries and territories, and now represents, through these organisations, more than 1,300,000 architects worldwide. The Royal Architectural Institute of Canada is the member section for Canada within the UIA.

The UIA's mission is to represent the global community of architects and to promote the profession within the following organizations:

- the UIA Member Sections;
- other non-governmental organizations (in order to develop interdisciplinary contacts):
  - ICOMOS (International Council on Monuments and Sites);
  - ICSID (International Council of Societies of Industrial Design);
  - ICOGRADA (International Council of Graphic Design Associations);
  - IFI (International Federation of Interior Designers);
  - ISOCARP (International Society of City and Region Planners);
  - INTA (International Development Association);
- intergovernmental institutions (in which the UIA is the only officially recognized association for architecture):
  - UNESCO (United Nations Educational, Scientific and Cultural Organization);
  - UNCHS (United Nations Centre for Human Settlements);
  - ECOSOC (United Nations Economic and Social Council);
  - UNIDO (United Nations Industrial Development Organization);
  - WHO (World Health Organization).

The UIA has also established the Professional Practice Commission, which has developed a basic framework regarding international standards of professionalism for architects. Adopted at the 1999 UIA Congress in Beijing, this framework assists nations and professional architectural associations in developing national standards and reaching mutual recognition agreements for the practice of architecture.

Architects Council of Europe (ACE)

www.ace-cae.org

The Architects' Council of Europe (ACE), as the only representative organization at the European level, aspires to speak with a single voice on behalf of the architectural profession.

It is based in Brussels and its Members are the regulatory and professional representative bodies of all European Union (EU) Member States, Accession States, Switzerland and Norway. Through them, ACE represents the interests of over 450,000 architects in Europe.

The principal function of the ACE is to monitor relevant policy and legislative developments at the EU level, seeking to influence those areas of EU Policy that have an impact on architectural practice, and on policies affecting the overall quality and sustainability of the built environment.

APEC Architect Project

www.apecarchitects.org

The Asia-Pacific Economic Cooperation (APEC) operates as a cooperative, multilateral economic and trade forum. The APEC Architect Project was endorsed by the Human Resources Development Working Group of the APEC in 2000 following a proposal by the Australian government to facilitate the mutual recognition of skills and qualifications of architects in the provision of professional services between member economies. The project is self-funded by the respective architectural organizations. A Secretariat rotating amongst the 14 member economies provides the necessary support to APEC Architect Project members and maintains a website.

The purpose of the APEC Architect Project is to establish a common basis for the recognition of professional competence that will simplify access to independent practice as an architect in other participating economies.

The Royal Architectural Institute of Canada is the member for Canada and hosts a register of architects interested in providing services within member economies of the APEC Architect Project.

Federation of Panamerican Architects' Associations or Federacion panamericana de asociaciones de arquitectos (FPAA)

www.fpaa-arquitectos.org

The Federation of Panamerican Architects Associations is an organization that brings together the associations of architects within the Americas (North, South, Central America and the Caribbean) and it represents Region III of the UIA (the Americas). FPAA is supported by a Secretariat in Uruguay and the working language of FPAA is primarily Spanish.

Although the RAIC has been a member of FPAA in the past, it is currently not a member.

North American Organizations

The American Institute of Architects (AIA)

The American Institute of Architects (AIA) was founded in New York City in 1857. The AIA is a representative body rather than a governing or controlling body. It divides the United States into regions, each of which is represented by a member on the Board of Directors. The regions have chapters; the number of chapters per region depends on the population density. The chapters' bylaws are set by the national body.

The AIA has more than 83,500 licensed architects (in 2008) and is a voluntary professional association dedicated to organizing and uniting the profession. The AIA requires its members to commit to a code of ethics and professional conduct, as well as to professional development through its program of continuing education.

Members of the RAIC may become associate AIA members. Refer to Chapter 1.1.5, *The Organization of the Profession in Canada*, for information on the RAIC.

National Council of Architectural Registration Boards (NCARB)

The National Council of Architectural Registration Boards (NCARB) is a not-for-profit corporation. All the legally constituted architectural registration boards of the 50 U.S. states and four territories are members. The NCARB assists its 54 Member Boards through the following activities:

- preparing and delivering a uniform examination — the Architect Registration Examination (ARE);
- establishing standards in education and training;
- verifying qualifications of applicants and certifying architects;
- developing standards for professional conduct;
- administering the Intern Development Program.

The provincial and territorial associations of architects work closely with the NCARB, and, in 1994, an Inter-Recognition Agreement was signed between between the NCARB and the former Committee of Canadian Architectural Councils (CCAC). This agreement assists architects in Canada and the United States to obtain architectural licences in most jurisdictions in each other's country. In addition, Canadian provincial and territorial licensing authorities continue to use and recognize the ARE as an examination to assess the competency of intern architects.

National Architectural Accrediting Board, Inc. (NAAB)

Formed in 1940, the National Architectural Accrediting Board, Inc. (NAAB) is responsible for accrediting professional degree programs in schools of architecture in the United States. This is similar to the accreditation function of the Canadian Architectural Certification Board (CACB) which has adopted most of the NAAB's accreditation criteria. The NAAB has a board of directors comprised of appointees from the following organizations:

- AIA (The American Institute of Architects);
- NCARB (National Council of Architectural Registration Boards);
- ACSA (Association of Collegiate Schools of Architecture);
- AIAS (American Institute of Architecture Students).

Association of Collegiate Schools of Architecture (ACSA)

The Association of Collegiate Schools of Architecture is not-for-profit, membership association founded in 1912 to advance the quality of architectural education. The association is based in the United States.

The Association of Collegiate Schools of Architecture (ACSA) is similar to the Canadian Council of University Schools of Architecture (CCUSA). The Association is comprised of of over 250 schools of architecture in several membership categories including all ten accredited university schools of architecture in Canada. A forum for "ideas on the leading edge of architectural thought," the ASCA publishes the *Journal of Architectural Education (JAE)* and a newsletter *(ACSA News)*.

Federación de Colegios de Arquitectos de la República Méxicana (FCARM)

The Federación de Colegios de Arquitectos de la Republica Méxicana (FCARM), or the Federation of the Colleges of Architects of the Republic of Mexico, is a national professional organization, with headquarters in Mexico City. FCARM is comprised of 71 "Colegios" representing about 15,000 architects.

Most Mexican jurisdictions (states) have a professional association known as a "Colegio," and these associations have united to form the national federation. The Colegios, which are responsible for establishing codes of ethics, deal with issues of professional practice and public complaints.

FCARM's mission is to:

- coordinate the needs and interests of its members;
- encourage professional development;
- develop standards of practice;
- promote the profession to the public.

As a result of the North American Free Trade Agreement (NAFTA), the FCARM has signed a Tri-national Agreement with some provincial associations of architects and the US National Council of Architectural Registration Boards (NCARB). Ratification and implementation of this agreement is underway.

Asociación de Instituciones de Enseñanza de la Arquitectura de la República Mexicana (ASINEA)

The Asociación de Instituciones de Enseñanza de la Arquitectura de la República Mexicana (ASINEA) has a similar function to the Canadian Council of University Schools of Architecture (CCUSA) and the Association of Collegiate Schools of Architecture (ACSA). Comprised of 81 schools of architecture, ASINEA has a multifaceted objective: the exchange of pedagogic, administrative, social, and academic information. As part of its efforts to continually enhance the several Schools and Facultades (faculties) of architecture within the Mexican Republic, ASINEA also deals with architectural criteria for education standards and curriculum.

Reference

Col.legi d'Arquitectes de Catalunya. *Architectural Practice Around The World*. COAC, 2005. *www.coac.net/internacional/defaultang.html*

Chart: Comparison of Licensing Procedures for Architects in Canada, the United States, and Mexico

	Canada	U.S.A.	Mexico
Education	Professional degree accredited by CACB or individual certification Graduation (professional degree) National	Professional degree accredited by NAAB Graduation (professional degree) National	Professional degree "Professional examination" 480 hours of social service Cédula ARCHITECT1 National
Certification of Academic Qualifications	CACB	NCARB	SEP2
Experience	Intern Architect Program (IAP) 5,600 hours experience National	Intern Development Program (IDP) 5,600 hours experience National (not mandatory in all states)	
Examination	Examination for Architects in Canada (ExAC) or the Architect Registration Examination (ARE) National	Architect Registration Examination (ARE) National	
Certification of Professional Qualifications	Provincial or territorial associations	NCARB (optional)	
Licence	Responsibility of provincial or territorial association of architects	Responsibility of state government agency	
Practice	**Architect** Most provinces have additional requirements for "Practice" (such as Certificate of Practice, Professional Liability Insurance)	**Architect** No restrictions	**Architect and/or Director Responsable de OBRA** No restrictions (in certain jurisdictions only)

Notes:
- Information has been developed from site visits by U.S.A./Canada Team to Mexican architectural education institutions, as part of Tri-National Committee on Architecture and NAFTA. (March 1, 1997)
- Information regarding Mexico is to be confirmed by Mexico.
- This chart is a simplified graphic representation of general procedures for licensing.
- "National" means that a national standard exists.

Footnotes:
1. The scope of practice allowed at the initial "Cédula" is restricted with regard to building size and type.
2. SEP is "Secretaría de Educación Publica".

List: International Organizations

International

- The Architects' Council of Europe
  29, rue Paul Emile Janson
  B-1050 Brussels, BELGIUM
  Tel: 32 2 543 1140
  Fax: 32 2 543 1141
  www.ace-cae.org

- Commonwealth Association of Architects (CAA)
  P.O. Box 508
  Edgware HA8 9XZ
  UNITED KINGDOM
  Tel: 44 20 8951 0550
  www.comarchitect.org

- PanAmerican Federation of Architects Associations (FPAA)
  General Secretary: Gonzálo Ramírez 2028.
  Montevideo, URUGUAY CP 11200
  Tel: (598) (2) 419.34.63
  Fax: (598) (2) 411.95.56
  Email: *fpaasau@adinet.com.uy*

- Union internationale des architectes (UIA) / International Union of Architects
  Tour Maine Montparnasse – B.P. 158
  33 avenue du Maine
  75755 Paris, cedex 15
  FRANCE
  Tel: 33 (1) 45 24 36 88
  Fax: 33 (1) 45 24 02 78
  www.uia-architectes.org

Mexico

- Federación de Colegios de Arquitectos de la Republica Méxicana (FCARM)
  Yucatan 189-201, Tizapan, San Angel
  Del Alvaro Obregon
  Distrito Federal
  México, D.F.
  MEXICO 01090
  Tel: (52 55) 55 50 60 49
  Fax: (52 55) 55 40 41 80
  www.fcarm.org.mx

United States

- The American Institute of Architects (AIA)
  1735 New York Avenue, NW
  Washington, D.C. 20006-5292 U.S.A.
  Tel: (202) 626-7300
  www.aia.org

- National Council of Architectural Registration Boards (NCARB)
  1801 K Street NW, suite 700-K
  Washington, D.C. 20006 U.S.A.
  Tel: (202) 783-6500
  Fax: (202) 783-0290
  www.ncarb.org

- National Architectural Accrediting Board, Inc. (NAAB)
  1735 New York Avenue, NW
  Washington, D.C. 20006 U.S.A.
  Tel: (202) 783-2007
  Fax: (202) 783-2822
  www.naab.org

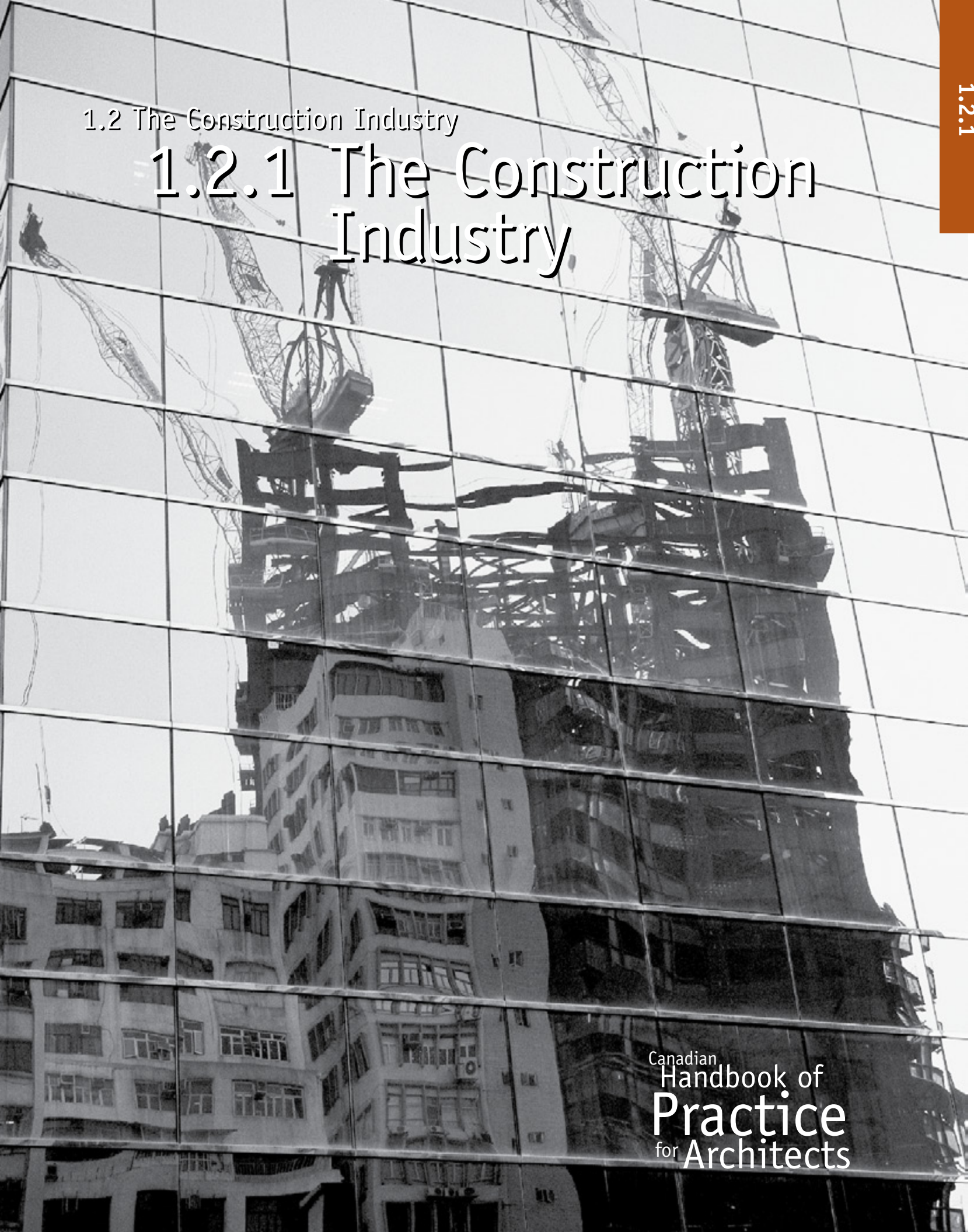
- Association of Collegiate Schools of Architecture (ACSA)
  1735 New York Avenue, NW
  Washington, D.C. 20006 U.S.A.
  Tel: (202) 785-2324
  Fax: (202) 628-0448
  www.acsa-arch.org

Others

- Royal Institute of British Architects (RIBA)
  66 Portland Place
  London W1N 4AD ENGLAND
  Tel: +44 207 580 5533.
  Fax: +44 207 255 1541.
  www.architecture.com

- Royal Australian Institute of Architects (RAIA):
  - National Office:
    Level 2, 7 National Circuit
    BARTON ACT 2600
    PO Box 3373
    MANUKA ACT 2603
    AUSTRALIA
    Tel: (02) 6121 2000
    Fax: (02) 6121 2001
    www.architecture.com.au

1.2.1 The Construction Industry



1.2.1

Overview

Participants of the Construction Industry
- Owners
- Designers
- Constructors
- Manufacturers and Suppliers
- Trades
- Bonding and Insurance Companies

Canada Green Building Council

Canadian Construction Association (CCA)

Provincial and Local Construction Associations

Construction Associations and Bid Depositories

Canadian Home Builders' Association (CHBA)

Construction Safety
- Workplace Safety Insurance Board or Workers Compensation Boards
- Construction Safety Associations

Construction Industry Consultative Committee (CICC)

Canadian Construction Documents Committee (CCDC)

Definitions

References

List: Canadian Construction Documents

The Construction Industry

Overview

According to the Canadian Construction Association, the non-residential sector employed close to 1.2 million people and produced $191 billion in goods and services in 2008. Add to this the value of residential construction, including multiple housing units, and it is clear that construction is the largest sector of the Canadian economy – this sector represents between 15% and 17% of Canada's gross domestic product.

The construction industry is divided into three major sub-sectors, each accounting for approximately one-third of the total construction industry. These sub-sectors:

- often respond to different market forces;
- often use different construction techniques and materials;
- often employ different labour forces.

All three sub-sectors are distinct, however in recent years there is more overlap between them:

- the **residential construction** sub-sector covers all dwellings from single-family homes to large apartment buildings;
- the **institutional, commercial, and industrial construction** sub-sector covers all buildings other than residential;
- the **engineering (or heavy civil) construction** sub-sector covers all non-building construction projects, including roads, sewer and water, bridges, dams, railways, ports, airports, pipelines, and oil and gas facilities.

The construction process is multifaceted and usually involves the following phases:

- studying the feasibility of the project;
- securing financing;
- developing the concept;
- developing the design;
- obtaining regulatory approval;
- building the project;
- commissioning the project;
- operating and maintaining the asset after project completion;
- demolishing and recycling the asset.

Participants in the Construction Industry

The building sub-sectors are composed of many loosely coordinated components, most of which fall into four major groups:

- **owners** — the public- and private-sector buyers of construction;
- **designers** — professionals such as architects and engineers, and others, including interior designers, planners, and various other consultants and technical personnel, responsible for the design documentation and overseeing of construction;
- **constructors** — contractors, sub-contractors, trade contractors, manufacturers, suppliers, and trades responsible for construction of buildings;
- **others** — lending institutions such as mortgage and finance companies, real estate services, trade associations, researchers, analysts, Authorities Having Jurisdiction, and other miscellaneous official and service agencies.

Owners

Building owners can be divided into two distinct groups:

- the public sector — responsible for projects ranging from simple school additions to major institutional and military installations;
- the private sector — ranges from homeowners requiring simple home renovations, through to corporations which build complex industrial and commercial buildings and multi-family residential buildings.

Governments at the federal, provincial, and municipal level contribute to — and influence — the construction industry in two ways:

- by enacting legislation regulating construction;
- by procuring, owning, leasing, managing, and maintaining their buildings.

Refer also to Chapter 1.2.2, *The Client*, for a more detailed discussion on owners.

Designers

Many kinds of designers are involved in the construction industry. However, because of the unique training that architects receive, they often act as prime consultant — or manager and coordinator — for most *building* design work meant for human occupancy greater than a certain area. Other buildings (such as industrial plants and warehouses), as well as other engineering construction (such as bridges), may involve an architect but not usually as the prime (or coordinating) consultant.

A host of specialist professionals and paraprofessionals assist architects in this role. Refer to Chapter 1.2.3, *Consultants*, for the roles of other consultants and designers in the construction industry.

Constructors

Construction is undertaken, for the most part, by:

- **general contractors** who assume overall responsibility for the construction of a project;
- **trade contractors** who perform specialized services.

Trade contractors usually operate as subcontractors to general contractors on new construction, but they often contract directly with owners for repair or renovation contracts, or when "Construction Management" is the selected method of construction procurement. To limit their financial exposure, construction firms operate with overheads that are low relative to the size of the projects that they undertake. Contractors traditionally use bank and supplier credit to finance their operations, and often lease equipment or finance it through chattel mortgages.

Contractors employ skilled labour and trades to build projects using custom-manufactured and/or standard products and components, supplied either directly from the manufacturer or through a system of individual suppliers and wholesalers.

Labour force and hiring practices in the construction industry are driven by market fluctuations. Most workers are hired on a project-by-project basis, often through union (and in some provinces, non-union) hiring halls. Often, only key personnel are employed on salary over the long term. Consequently, firms quickly expand and contract their operations (and enter and exit the industry) in a relatively flexible manner in response to changing business conditions.

Manufacturers and Suppliers

In many instances, materials and products selected for construction are manufactured to established requirements of codes and standards. Product standards used in the construction industry are established by various standards-writing bodies, composed of a combination of:

- users/owners;
- manufacturers;
- technical and trade specialists;
- building industry manufacturers and suppliers;
- Authorities Having Jurisdiction;
- building design professionals;
- testing agencies.

The architect selects materials and products meeting these requirements for incorporation into the work. Materials and products may be

"off the shelf " or custom manufactured for each project.

Refer also to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies,* and Trade Associations.

Manufacturers and suppliers can be excellent sources of technical assistance for the architect. Typically, manufacturers provide the architect with technical information and product samples to review and to include in the office library. Manufacturers and suppliers frequently participate in construction industry trade shows, such as IIDEX and Construct Canada, which:

- showcase new and existing products and building components;
- provide the latest technical information.

Trades

Trade or specialty sub-contractors employ skilled labour to:

- incorporate pre-manufactured and custom products and materials into the built work;
- undertake specialized construction procedures (such as scaffolding or core drilling).

These skilled tradespeople include carpenters, masons, plasterers, plumbers, steel workers, electricians, and many other classes of skilled workers.

Workers are trained on the job as journeymen or apprentices until they achieve the required level of competence. Community colleges/cégeps (collège(s) d'enseignement général et professionnel) and vocational schools, in consultation with trade unions and other standards-setting organizations, provide supplementary training. Certain skilled workers — such as plumbers, electricians, and elevator installers — must be licensed.

Refer also to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*.

Bonding and Insurance Companies

An important part of the construction industry are the different companies which:

- provide bonds, known as sureties, to contractors;
- underwrite and provide insurance to contractors and owners;
- provide professional liability insurance to design professionals.

For more information on construction insurance, refer to CCDC 21, *A Guide to Construction Insurance*.

For more information on bonds and sureties, refer to CCDC 22, *A Guide to Construction Surety Bonds*.

For information on the Canadian Construction Documents Committee or CCDC, refer to page 7 of this Chapter.

In most jurisdictions, architects and engineers are required to carry professional liability insurance. There are a few private insurance companies which provide this specialized insurance. Because of the high cost of premiums for architects due to the limited availability or competition in the marketplace for this type of insurance, and to ensure accessiblity to all members, some associations have established their own liability insurance funds.

The Ontario Association of Architects has established its own indemnity plan which provides the mandatory indemnification required by the Ontario *Architects Act*.

In Québec, by virtue of the Professional Code and the regulations of the OAQ, architects who practise on their own must contribute to the Professional Liability Insurance Fund of the OAQ.

Refer to "Charts: Comparison of Practice Requirements of each Provincial Association" in Chapter 1.1.5, *The Organization of the Profession in Canada,* for the professional liability insurance requirements for architects in each province.

Canada Green Building Council

The Canada Green Building Council was formed in December 2002. Orginally it was the Sustainable Buildings Canada Committee of the Royal Architectural Institute of Canada; however, after a couple of successful years the Committee very quickly had outgrown its original mandate, and included many members from the design and construction industry who were not architects, and it needed to expand. The RAIC assisted in the creation of the CAGBC, provided administrative support, and housed the CAGBC in its offices during its formative years.

The CAGBC now develops and administers a Canadian version of the popular LEED® (Leadership in Energy and Environmental Design) rating systems for buildings. It is affiliated with the US Green Building Council and holds the licence for LEED® in Canada.

Refer to Chapter 2.3.4, *Pre-design* - Appendix A - *Green Building Rating Systems*, for more information on LEED®.

Canadian Construction Association (CCA)

Founded in 1918, the Canadian Construction Association (CCA) is a national body with a membership of more than 20,000 individuals and companies. The CCA represents the interests of the construction industry throughout Canada. Seven active sections and eleven standing committees take responsibility for completing the CCA's ongoing tasks in the following areas:

- apprenticeship;
- contract and bidding practices;
- electronic dissemination of bid documents;
- employment equity;
- the environment and sustainable development;
- infrastructure promotion;
- interprovincial trade barriers;
- research and development;
- taxation issues affecting the construction industry and employment insurance reform.

The CCA is governed by an executive committee and a board of directors comprised of volunteer members. The members, who are selected from a variety of constituent groups with different construction-related interests, are elected at the annual general meeting.

Based in Ottawa, the CCA represents the industry's national interests when lobbying the federal government.

For further information, contact:

Canadian Construction Association
400-75 Albert Street
Ottawa, Ontario K1P 5E7
Tel: (613) 236-9455
Fax: (613) 236-9526
www.cca-acc.com

Provincial and Local Construction Associations

Most urban communities throughout Canada have construction associations.

Membership in these associations often includes a fully integrated affiliate membership in the Canadian Construction Association. In this case, members enjoy all the benefits and privileges of membership in the national association as well as those offered by the local associations. Local construction associations have the following aims and objectives:

- representation at local, provincial, and (through the CCA) federal levels of government;
- the provision of education and professional development to industry members;
- the operation of display services for plans and specifications for the convenience of owners, designers, and member firms;
- the provision of labour relations services;
- the provision of alternative dispute resolution services;
- the promotion of business relations between members of every sector of the construction industry in the community;
- resolution of industry-related concerns raised by members.

To achieve these aims and objectives, each association periodically elects a chairperson and board of directors selected from the membership at large. Equal representation is sought from the following industry sectors:

- general contractors;
- trade contractors;
- mechanical and electrical contractors;
- manufacturers, supply and service companies, and professionals.

Elected representatives from each construction association or local chapter within a province also form a provincial council. The council's tasks include lobbying the provincial government on issues such as:

- workers compensation;
- health and safety legislation;
- lien legislation;
- provincial tax matters;
- employment equity;
- other construction industry-related issues.

For more information on affiliated provincial, regional, and local construction associations, contact the provincial or local construction association.

Construction Associations and Bid Depositories

Most urban communities throughout Canada have a bid depository.

In many instances, bid depositories operate as an adjunct to the local construction association under the direction of a chair and board of directors, who are elected periodically from volunteer representatives of local user groups and professionals.

Construction associations and their bid depositories help to manage the bid process by:

- disseminating bid documentation, information, and addenda;
- promptly collecting trade contractor bids for multiple-trade projects.

These trade or sub-contractor bids are distributed to general contractors so that they may be included in the general contractor's bid for major construction projects.

Bidding through bid depositories follows a strict set of rules and guidelines. The purpose of these rules is to:

- minimize confusion;
- limit bid shopping;
- make all required information available to all members of each bid depository and to all general contractor bidders registered with that bid depository.

Bid depositories are usually organized at the provincial level. Boards or committees are elected or appointed to:

- prepare rules and procedures;
- provide dispute resolution services if a dispute arises out of the bidding process.

For more information on rules, procedures, and other services, contact the local bid depository.

Recently the Canadian Construction Association has established CaNet, or the Construction Association Network, a network of electronic plan rooms to advertise and distribute procurement opportunities to the construction industry.

Architects may provide bid documents to CANet or to other private sector electronic plans rooms such as Merx, a subsidiary of Mediagrif Interactive Technologies Inc.

Canadian Home Builders' Association (CHBA)

The Canadian Home Builders' Association (CHBA) represents Canada's residential construction industry, with more than 8,000 member firms across Canada. CHBA members represent every area of Canada's housing industry — new home builders and renovators, land developers, trade contractors, product and material manufacturers, building product suppliers, lending institutions, insurance providers, service professionals, and others.

For further information on the CHBA, contact:

Canadian Home Builders' Association
150 Laurier Avenue W., Suite 500
Ottawa, Ontario K1P 5J4
Tel: (613) 230-3060
Fax: (613) 232-8214
www.chba.ca

Construction Safety

The architect needs to understand the importance of construction safety and the environment in which construction safety is regulated. Construction safety is a provincial responsibility, and there are means both for insuring workers and for securing a safe construction site in every jurisdiction. The architect should be familiar with the requirements in the province in which each project is located.

Workplace Safety Insurance Board or Workers Compensation Boards

Construction, like many industries, is hazardous. Many serious and permanent injuries, or even deaths, occur on construction sites each year.

To minimize the proliferation of individual personal injury lawsuits resulting from workplace injuries, each province has assumed the responsibility for paying compensation to injured workers. This benefit is in return for workers surrendering their rights to pursue lawsuits or legal action. Workers compensation legislation varies province by province. In some provinces, workers compensation and health and safety are administered by one organization.

The adjudication of claims is overseen by a board or commission, which reviews each case on its own merits and awards benefits to injured workers based on pre-established policies and a scale of compensation.

To finance this system and its claims, employers are assessed based upon the degree of exposure to workplace hazards by their workers. The board establishes installments or premiums, which are to be paid by each employer for every worker in its employ. All employers are required to maintain installments in good standing to the compensation board. Failure to comply can result in significant fines or even prosecution.

Architects, just like contractors, employ workers exposed to the dangers of construction sites, and thus are required to maintain such installments in good standing. Because not all provinces require architects to pay workers compensation premiums, architects should confirm their obligations with Workers Compensation Boards in the province in which they practise.

In addition, architects — as part of the construction administration services performed for clients — should verify that all construction workers employed by contractors on each project are covered by workplace safety insurance by obtaining letters of good standing. Architects should routinely request from the general contractor a certificate of good standing issued by the local provincial workplace safety insurance board to verify that all workers are protected. Failure to do so may result in claims involving the client, the constructor, and the injured worker. Refer also to Chapter 2.3.10, *Contract Administration — Office Functions* and Chapter 2.3.11, *Contract Administration — Field Functions*.

For more information on workplace safety (compensation) insurance, contact the provincial workplace safety insurance board.

Construction Safety Associations

Some provincial construction safety associations offer a broad range of products and services to help reduce the number of job-site accidents, injuries, occupational diseases, and fatalities. In most instances, construction safety associations operate under the provincial workers compensation legislation to promote health and safety in the construction industry.

The associations operate through a system of joint labour/management committees, which:

- review worksite health and safety problems;
- make recommendations to government and other organizations for improvements to legislation and regulations affecting the construction industry.

The associations engage consultants to:

- conduct safety audits and accident analysis;
- design programs for general safety and projects for special needs.

Besides acting as a secretariat to the labour and management committees, these associations also offer training and educational programs through community colleges/cégeps and other

venues for apprentices, journeymen, trade unions, management organizations, and individual firms.

In addition, these safety associations:

- conduct research on hazardous products;
- develop safety procedures;
- compile statistics;
- publish periodicals.

For more information on activities, services, products, and publications, contact the provincial construction safety association.

Construction Industry Consultative Committee (CICC)

The Construction Industry Consultative Committee (CICC) is comprised of the chief elected and senior staff officers of the following national organizations:

- Association of Canadian Engineering Companies (ACEC);
- Canadian Construction Association (CCA);
- Construction Specifications Canada (CSC);
- Royal Architectural Institute of Canada (RAIC).

Refer to this chapter for a description of the CCA. Refer to Chapter 1.1.4, *The Organization of the Profession in Canada,* for a description of the RAIC. Refer to Chapter 1.2.3, *Consultants,* for a description of the ACEC and of the CSC.

The CICC's role is to provide a forum for the exchange of information, views, and policy on issues of general and specific interest to the construction industry. The CICC attempts to express these positions in a coordinated and consistent manner, representative of the entire construction industry, and to communicate its position to government or other public bodies.

Its administrative function is to oversee, coordinate, and direct the activities of the Canadian Construction Documents Committee (CCDC) and to promote the use of CCDC Documents.

For further information on the CICC, contact:

The Secretary
Construction Industry Consultative Committee
400-75 Albert Street
Ottawa, Ontario K1P 5E7
Tel: (613) 236-9455
Fax: (613) 236-9526

Canadian Construction Documents Committee (CCDC)

The Canadian Construction Documents Committee (CCDC) is comprised of skilled and experienced practitioners from each sector of the consulting and construction industry, to represent their sector interests. The practitioners are selected by the following national organizations:

- Association of Canadian Engineering Companies (ACEC);
- Canadian Construction Association (CCA);
- Construction Specifications Canada (CSC);
- Royal Architectural Institute of Canada (RAIC).

In addition, there are representatives from "owners" groups or organizations as well as a representative of the legal profession.

The CCDC's activities are governed by the Construction Industry Consultative Committee, which sets an annual agenda of activities for the CCDC.

The CCDC's role and responsibilities are to periodically revise, update or draft new standard forms of contract and other national, standard guides and documents, for general use by the construction industry in both the private and public sectors throughout Canada.

All decisions of the CCDC are reached through consensus. Only when consensus is achieved on an entire document, is it offered to the four national organizations with a recommendation for endorsement. All constituent bodies must endorse all CCDC-prepared documents before publication.

For further information on the CCDC, contact:

The Secretary
Canadian Construction Documents Committee
400-75 Albert Street
Ottawa, Ontario K1P 5E7
Tel: (613) 236-9455
Fax: (613) 236-9526
www.ccdc.org

Refer to "List: Canadian Construction Documents" at the end of this chapter.

Definitions

Construction: The erection, installation, extension or repair of a physical structure.

Constructor: A person who contracts with an owner or the owner's authorized agent to undertake a project; includes an owner who contracts with more than one person for the work on a project, or who undertakes the work on a project or part thereof. (National Building Code)

Journeyman: Apprentice or employee of a specialized trade contractor.

References

Canada. Industry Canada. *Sector Competitiveness Frameworks: Construction: Part 1 — Overview and Prospects*. Ottawa, Ont.: Industry Canada, 1998

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.
CCDC 21 - 2000 *A Guide to Construction Insurance*
CCDC 22 - 2002 *A Guide to Construction Surety Bonds*

Carson, John C., Q.C. *Carson's Construction Dictionary: Law and Usage in Canada*. Willowdale, Ont.: Toronto Construction Exchange, 1989.

Daily Commercial News/Journal of Commerce.
Daily Commercial News. Daily newspaper. Toronto, Ont.
Journal of Commerce. Semi-weekly newspaper. Vancouver, BC.

Forbes, J.R. *Dictionary of Architecture and Construction — French/English and English/French*. Second edition. Paris, France: Technique et Documentation — Lavoisier, 1990.

Maclean, James H. and John S. Scott. *Dictionary of Building*. Fourth edition. London, England: Penguin Books, 1995.

Revay and Associates Limited. *The Revay Report*. Published quarterly. Montréal, QC: Revay and Associates Limited.

Stein, J. Stewart. *Construction Glossary*. Toronto, Ont.: John Wiley & Sons, 1980.

List: Canadian Construction Documents

RAIC Standard Form of Contract Documents

Reference	Title	Source
RAIC Document 6	Canadian Standard Form of Contract for Architectural Services	RAIC
RAIC Document 7	Canadian Standard Form of Agreement Between Client and Architect (Abbreviated Version)	RAIC
RAIC Document 8	Short Form Agreement Between Client and Architect	RAIC
RAIC Document 9	Canadian Standard Form of Contract Between Architect and Consultant	RAIC

ACEC Agreements

Reference	Title	Source
ACEC Document 31	Agreement Between Client and Engineer	ACEC
Companion to ACEC Document 31	Guidelines for Engineering Practice	ACEC
ACEC Document 32	Sub-Consultant Agreement	ACEC
ACEC Document 33	Client and Geotechnical Engineer	ACEC
	Recommended Guidelines for Provision of Geotechnical Information in Construction Contracts	ACEC
ACEC Document 35	Project Management Services	ACEC
ACEC Document 36	Studies and Reports	ACEC
ACEC Document 39	Owner and Owner's Engineer Agreement (Design-Build)	ACEC

CCDC Contract Forms

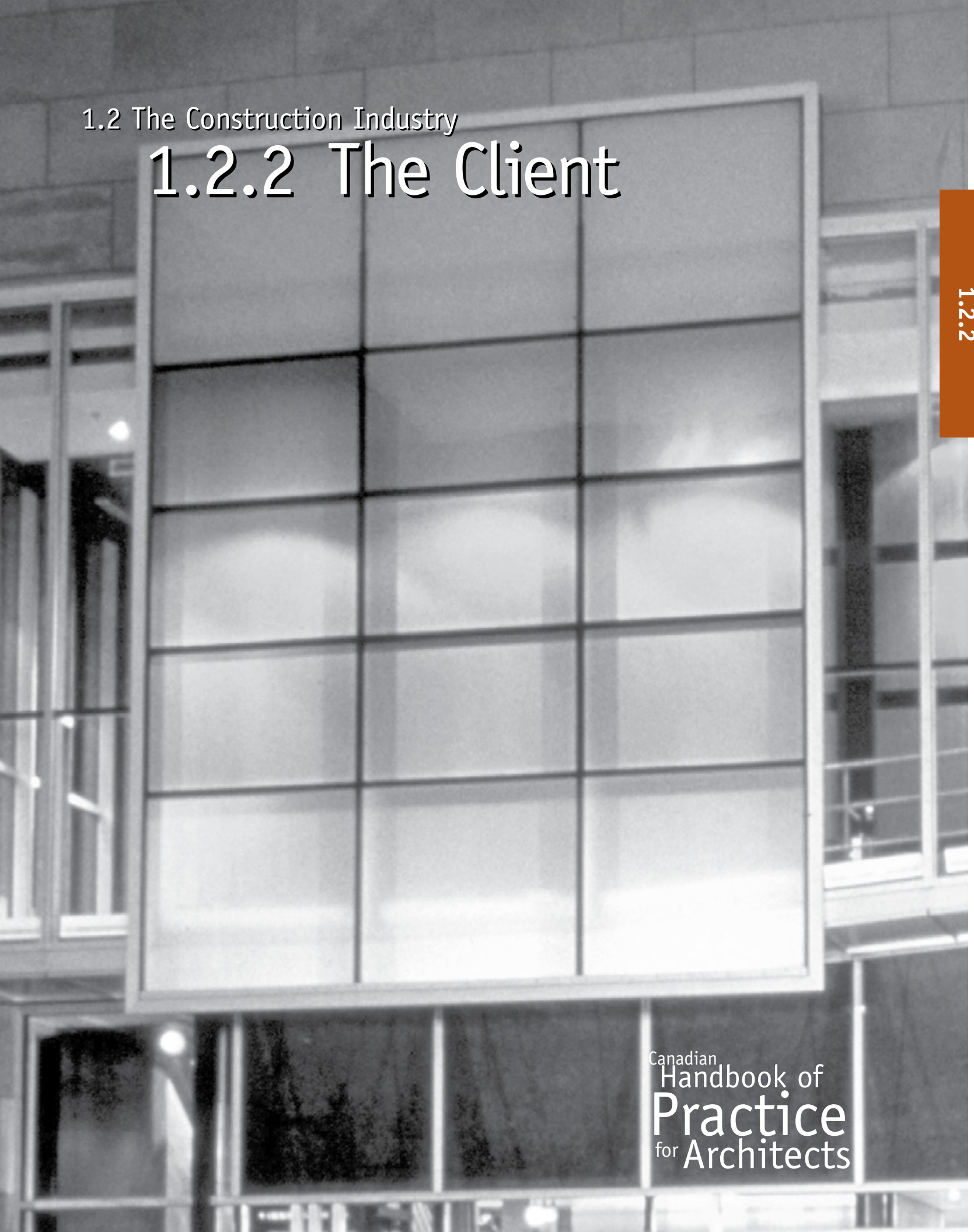
Reference	Title	Source
CCDC 2	2008 Stipulated Price Contract	CDDC
CCDC 3	1998 Cost Plus Contract	CDDC
CCDC 4	1982 Unit Price Contract	CDDC
CCDC 9A	2001 Statutory Declaration	CDDC
CCDC 9B	2001 Statutory Declaration	CDDC
CCDC 11	1996 (R2006) Contractor's Qualification Statement	CDDC
CCDC 12	1994 Project Financial Information	CDDC
CCDC 14	2009 Design-Build Stipulated Price Contract	CDDC
CCDC 15	2009 Design-Builder/Consultant Contract	CDDC
CCDC 18	2001 Civil Works Contract	CDDC
CCDC 220	2002 Bid Bond	CDDC
CCDC 221	2002 Performance Bond	CDDC
CCDC 222	2002 Labour and Material Payment Bond	CDDC

CCDC Guide Documents

Reference	Title	Source
CCDC 20	2008 A Guide to the Use of CCDC 2 - 2008 Stipulated Price Contract	CDDC
CCDC 21	2000 A Guide to Construction Insurance	CDDC
CCDC 22	2002 A Guide to Construction Surety Bonds	CDDC
CCDC 23	2005 A Guide to Calling Bids and Awarding Contracts	CDDC
CCDC 24	1996 A Guide to Model Forms and Support Documents	CDDC
CCDC 40	2005 Rules for Mediation and Arbitration of Construction Disputes	CDDC
CCDC 41	2008 CCDC Insurance Requirements	CDDC
CCDC 43	1998 A Guide to the Use of CCDC 3 - 1998 Cost Plus Contract	CDDC
CCDC 48	2002 A Guide to the Use of CCDC 18 - 2002	CDDC

CCA Standard Documents

Reference	Title	Source
CCA 1 - 2001	STIPULATED PRICE SUBCONTRACT	CCA
CCA 5 - 1988	CONSTRUCTION MANAGEMENT CONTRACT FORM	CCA
CCA 16 - 1992	GUIDELINES FOR DETERMINING THE COSTS ASSOCIATED WITH PERFORMING CHANGES IN THE WORK	CCA
CCA 17 - 1996	STIPULATED PRICE CONTRACT FOR TRADE CONTRACTORS ON CONSTRUCTION MANAGEMENT PROJECTS	CCA
CCA 25 - 2001	A GUIDE TO PROJECT MANAGEMENT SERVICES	CCA
CCA 26 - 2000	A GUIDE TO CONSTRUCTION MANAGEMENT CONTRACTS	CCA
CCA 27 - 1997	A GUIDE ON CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLANNING	CCA
CCA 28 - 1996	A GUIDE TO IMPROVING CASH FLOW IN THE CONSTRUCTION INDUSTRY	CCA
CCA 50 - 2003	A PRIME CONTRACTOR'S GUIDE TO PROJECT FINANCING AND PAYMENT SECURITY	CCA
CCA 61 - 2008	RISKS OF PRE-PURCHASING EQUIPMENT AND MATERIALS FOR CONSTRUCTION PROJECTS	CCA
CCA 81 - 2001	A BEST PRACTICES GUIDE TO SOLID WASTE REDUCTION	CCA
CCA 82 - 2004	MOULD GUIDELINES FOR THE CANADIAN CONSTRUCTION INDUSTRY	CCA
CCA 83 - 2004	ENVIRONMENTAL BEST PRACTICES GUIDE FOR HOT MIX ASPHALT PLANTS	CCA
CCA 90 - 2007	GUIDELINES FOR ELECTRONIC PROCUREMENT	CCA
Guide - 1993	RECOMMENDED GUIDELINES FOR PROVISION OF GEOTECHNICAL INFORMATION IN CONSTRUCTION CONTRACTS	CCA
Guide - 2000	A TRADE CONTRACTOR'S GUIDE AND CHECKLIST TO CONSTRUCTION CONTRACTS	CCA



1.2.2 The Client

Canadian Handbook of Practice for Architects

1.2.2

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The Client

Introduction

It has been stated that good architecture is not possible without a good client. To ensure good architecture, the architect must be dedicated to establishing and nurturing successful relationships with all clients.

Clients may range from individuals to multinational corporations, from large government agencies to small private-sector firms, from offshore developers to the actual occupants of a building. The importance of a client cannot be underestimated. In contrast to a "customer" (someone who purchases goods or products), a "client" purchases professional services. This chapter discusses the various types of clients and their relationship with the architect.

The Client

In response to some sort of demand, the client decides to pursue a course of action which could result in a building project. The client:

- usually selects the prime participants;
- usually pays for the required design, construction, and subsequent operation of the facility;
- may be the owner, the user or the occupant of the building, or a combination of all three;
- participates, with other users, in an Integrated Design Process from the project outset;
- may be a Design-Builder.

In addition to understanding the distinctions between an owner, a user, and an occupant, the architect must address the requirements of each.

Owners

Owners usually hold the ownership or legal title to the land or site and to the completed building project. The owner may or may not be the client, and may or may not be the user of a building. For example:

- a government office building may be owned by the "Crown" (that is, the government);
- the client may be a government department such as Public Works and Government Services Canada (PWGSC);
- the user may be a different agency of government;
- the occupant may be public service workers and the general public.

Stakeholders

Stakeholders of any building project may include the users or the occupants of a building. Each group may have very different levels of involvement in the building.

Users are the groups or individuals who use the building. They may include the prime tenant(s) of a building or its residents. Typically, the users are concerned with the following building elements:

- location and site selection;
- life span;
- design, including comfort and safety;
- operation and maintenance.

Occupants are the individuals who occupy or use the facility on a day-to-day basis. They may be apartment dwellers, workers, secondary tenants, businesses, or the general public who may use the building as patients, restaurant diners, shoppers, tourists, etc. Occupants have no direct involvement with the design and implementation of a building project.

Illustration 1: The Client

BUILDING	Owner	User	Occupant	Client
Federal Prison	"the Crown"	prison authority (Correctional Services Canada)	guards, staff, prisoners, visitors	*(client may be **PWGSC**)*
Church	religious organization	local congregation or parish	community groups, churchgoers, clergy, staff	*(client may be represented by a **Building Committee**)*
Custom Residence	married couple	family (married couple and their two children)	family, relatives, and guests	***married couple***

Others
Many other groups may be involved in the building, including:

- building managers or facility management companies;
- local residents, neighbours, and ratepayers associations;
- financial institutions that fund the design and construction;
- Authorities Having Jurisdiction.

The architect must respond to the requirements of all these groups and, at the same time, ensure that the client's requirements are paramount.

Client Types

Each client has a unique personality, a style of operating, and a different expectation of involvement in the project. Client types include:

- corporate;
- government
- institutional and;
- small business owners or individuals.

Clients are sometimes referred to as private sector or public sector.

Some of the characteristics of each client type are listed below.

Corporate

Corporate clients are either:

- private-sector businesses that are incorporated; or
- not-for-profit corporations; or
- public-sector Crown corporations.

These clients could be small, family-owned enterprises or large, multi-national conglomerates. The method for decision-making, funding approvals, and architect selection may vary significantly from one corporate client to another. Typically, a corporation will appoint a representative to liaise with the architect and manage the project for the corporation. The client's representative may have limited authority and is usually accountable to a committee, a board of directors, or a president and chief executive officer. At times, it may be prudent to obtain a copy of a resolution of the board of directors assigning authority to the client representative.

Corporate clients:

- may be sophisticated clients with significant in-house expertise;
- may never have been involved in an architectural project;
- may include developers who are sophisticated in the design and construction process;
- tend to be business-oriented;
- expect excellent and prompt service;
- may not be accustomed to using industry standard client-architect agreements, preferring instead to use purchase orders or "in-house" contracts.

Government

Government clients can come from the municipal, regional, provincial or federal level. Legislative and regulatory procedures, as well as public accountability, will dictate the approach of government clients to building projects. The decision-making process is democratic and usually transparent but often very slow. Multiple reviews of documents and lengthy approvals are typical and architectural fees for these reviews and approvals should be negotiated. Each government agency has its own unique requirements and "bureaucratic personality," and it may be fragmented into various departments. Government clients, especially provincial and federal governments, are usually more experienced and have access to in-house professional and technical expertise to assist them with their projects.

The federal government and, increasingly, other levels of government and certain public agencies list their project opportunities and Requests for Proposals (RFPs) on a central electronic bulletin boards. Architects interested in public commissions should regularly review electronic bulletin boards such as Merx located at *www.merx.com*

Examples of typical government clients are:

- Public Works and Government Services Canada (PWGSC);
- Canada Post;
- Ontario Realty Corporation (Crown corporation);
- The Regional Municipality of Ottawa-Carleton;
- The City of Saint John;
- The Village of Saint-Joseph-de-la-Rive.

Government clients frequently have their own form of standard contract. Refer to Chapter 2.1.9, *Risk Management and Professional Liability*, for the pitfalls of non-standard contracts.

Institutional

Institutional clients typically receive monies from government, public fund-raising efforts, grants, endowments, or other external sources of funds. These clients include hospitals, school boards, museums, and social service organizations.

In some respects, institutional clients are like government clients in that they may have similar methods for selecting architects and have the same requirements for accountability (to government, public funding agencies, donors, benefactors). Some institutional clients do not have professional or technical staff. Sometimes, institutional clients include volunteers on governing boards who may be involved in building committees which liaise with the architect.

Examples of typical institutional clients are:

- Calgary Board of Education;
- Hôpital Général du/the Lakeshore General Hospital;
- Winnipeg Art Gallery;
- John Howard Society;
- central business district associations;
- ratepayers groups.

Large institutional clients sometimes have their own form of standard contracts. Refer to Chapter 2.1.9, *Risk Management and Professional Liability*, for the pitfalls of non-standard contracts.

Small Business Owners or Individuals

These clients — which include small business owners and individuals — are frequently the owner, user, and occupant of the building. Small business owners who may require premises for their business operations, or leasehold improvements to existing facilities, are typical private clients. Individuals, couples, and families who want to renovate an existing home or construct a new custom home are also typical of this client type.

Informal procedures and inexperienced clients may mean that the architect has to be more rigorous about documentation, communications, expectations, and presentation. The architect may find that these small business owners or individual clients will need to be educated and guided through the design and construction process. Others may be small developers or builders who may be more knowledgeable and demanding.

Client Relationships

Communications

It is important for the architect to understand the client and his/her motives for constructing the building and to establish regular, consistent and clear lines of communication. The architect must clearly define and outline the design and construction process in order to avoid unrealistic expectations. The architect should not submit to ill-informed client requests nor neglect to inform the client of project problems and their consequences. As well, the architect must develop and analyze all options, and obtain the client's support for, and approval of, the solution to a problem.

Professional Responsiblity

Because the client has retained a professional, it is assumed — and upheld by legal precedent — that the client is not knowledgeable and is dependent on the guidance of a professional, in this instance, the architect. When dealing with the client, the architect must exercise professional judgement at all times.

Clients differ in their level of involvement in architectural projects as well as in the role they expect of architects. Sometimes the architect is given considerable latitude and autonomy; on the other hand, the architect may have a very narrowly-defined role and be able to make only a few recommendations.

Managing client relationships and personalities is similar to other human relationships and the management of people and human resources. Refer to the many management and business publications for information on developing and sustaining client relationships.

Client Associations

A common interest in owning, managing, maintaining, and operating buildings has led to the formation of client associations, the best known of which is the Building Owners and Managers Association.

Building Owners and Managers Association (BOMA)

BOMA Canada is an affiliated member of BOMA International, which was founded in 1907 as the National Association of Building Owners and Managers. The association assumed its present name in 1968 as it broadened its reach to include Canada and other affiliates around the globe. Today, BOMA International represents over 100 North American and nine overseas affiliates in Australia, Brazil, Finland, Indonesia, Japan, Korea, the Philippines and South Africa.

BOMA is primarily concerned with commercial real estate, that is office buildings, and its principal members own or manage commercial office space. Associate members provide the goods and services needed to operate these buildings.

BOMA Canada's Mission is to represent the Canadian commercial real estate industry on matters of national concern, to develop a strong communications network between its local associations, BOMA International and other real estate associations and promote professionalism of its members through education programs and effective public relations activity.

The association publishes numerous research and reference materials including the *Standard Method for Measuring Floor Area in Office Buildings*, the standard known as ANSI/BOMA Z65.1-1996 and the BOMA/SIOR 2001 *Standard for Measuring Floor Area in Industrial Buildings*.

The BOMA Canada web site is found at:
www.bomacanada.ca

Others

Building Owners and Managers Institute (BOMI)
Building Owners and Managers Institute (BOMI) of Canada was founded in 1974 by members of the Building Owners and Managers Association (BOMA) who recognized a need for quality education in the commercial property industry. Course materials for the RPA, FMA, SMT, and SMA designation programs are produced in the United States by BOMI, headquartered just outside of Annapolis, Maryland. To ensure that these programs include the appropriate Canadian content, BOMI Canada works closely with the Institute and Canadian authors and reviewers.
www.bomicanada.com

The Association of Higher Education Facilities Officers (APPA)
The Association of Higher Education Facilities Officers (APPA) serves facility planners in the education community, particularly universities and colleges.

APPA
1643 Prince Street
Alexandria, VA
22314-2818 U.S.A
Tel: (703) 684-1446
Fax: (703) 549-2772
www.appa.org

The International Facility Managers Association (IFMA)
The International Facility Managers Association (IFMA) has a certification program for Certified Facility Managers (CFMs) and conducts research, provides educational programs, recognizes facility management degree and certificate programs and produces World Workplace, the world's largest facility management conference and exposition.

IFMA
IFMA Headquarters
1 E. Greenway Plaza, Suite 1100
Houston, Texas
77046-0194 U.S.A.
Tel: (713) 623-4362
Fax: (713) 623-6124
www.ifma.org

Council of Educational Facility Planners International (CEFPI)
The Council of Educational Facility Planners (CEFPI) is a professional association whose sole mission is improving the places where children learn. CEFPI members — individuals, institutions and corporations — are actively involved in planning, designing, building, equipping and maintaining schools and colleges.

CEFPI
9180 E. Desert Cove, Suite 104,
Scottsdale, Arizona
85260 U.S.A.
Tel: (480) 391-0840
Fax: (480)391-0940
www.cefpi.org

Client-Architect Agreements

When providing professional services to a client, the architect should always have a written agreement which outlines:

- the services provided;
- the fee for the services;
- the various terms and conditions which govern the agreement (including client responsibilities).

At the outset, architects should provide the client with a detailed explanation about what is included and **not** included in the agreement. Most disputes occur at the end of the project due to the differing expectations of the parties to the agreement.

The *Canadian Standard Forms of Contract Between Client and Architect (RAIC Documents Six and Seven)* outline certain client responsibilities. The client may choose to retain the architect as prime consultant, with the architect retaining the engineers and other necessary consultants as sub-consultants (see Illustration 2). On the other hand, the client may retain the architect separately and also retain the engineers directly through separate agreements (see Illustration 3). In this instance, the architect must ensure that the architect's services and fees for coordination and management of the consultants are clearly understood and agreed to.

Responsibilities

Frequently, the architect may need to inform the client of the need for timely and accurate information and approvals during the course of the project. The client is responsible for providing the architect with:

- a program or design brief (refer to Chapter 2.3.4, *Pre-design*);
- a construction budget;
- required information, surveys, reports, and other specialist professional services.

The architect often assists the client in obtaining some of this necessary information.

The services of many of the specialist consultants required at the pre-design phase of a project, such as geotechnical engineers and environmental consultants, are not covered in

most professional liability insurance policies for architects. As a result, the architect should ensure that the client retains these consultants directly. However, the architect may:

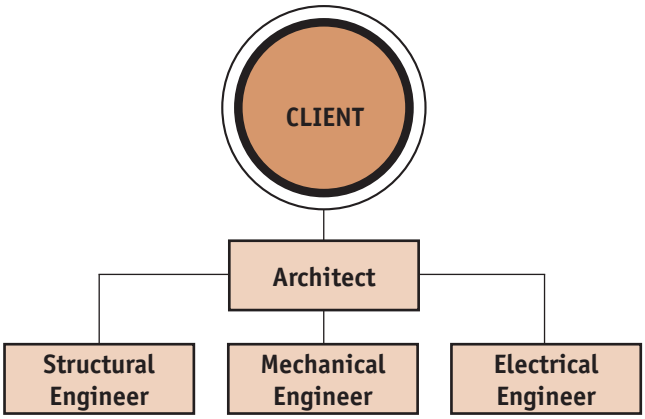
- assist the client in the engagement of these specialists;
- identify the information required, such as a typical grid for topographic survey or the location and size of a building for the geotechnical engineers.

Client Representative

To ensure clear and non-conflicting instructions from the client, only **one voice** should give direction to the architect. Any other situation would be unwieldy and inefficient, for example, establishing a building committee for a project where the architect's day-to-day contact is with all members of the committee.

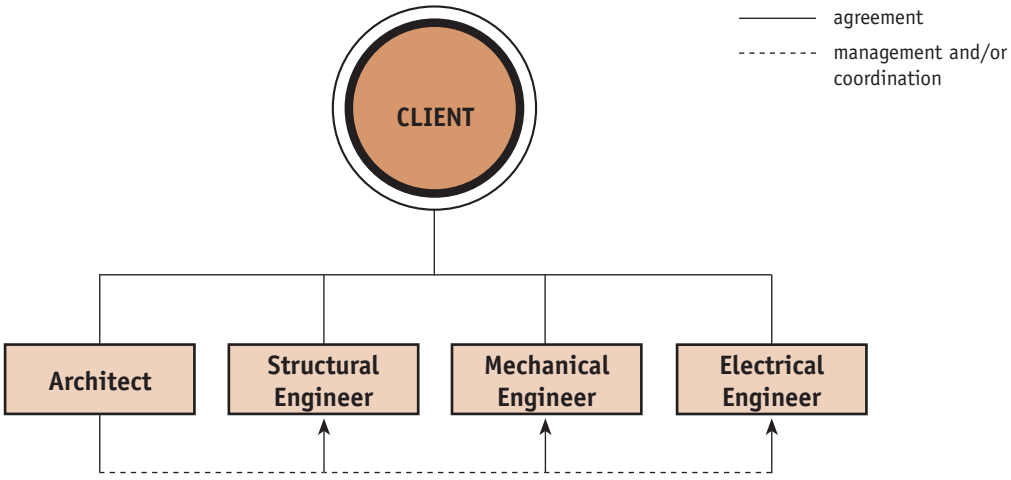
The standard forms of contract indicate that one of the client's responsibilities is to appoint a representative or to "authorize in writing a

Illustration 2: Architect as Prime Consultant



There are a variety of other methods of project delivery such as Design-Build, Construction Management and Public Private Partnerships. In each, the relationship between the architect and client varies significantly. Refer to Chapter, 2.3.2, Types of Construction Project Delivery.

Illustration 3: Separate Agreements:
Architect as Managing and Coordinating Consultant



person to act on the client's behalf and define that person's scope of authority with respect to the Project when necessary." Sophisticated clients, or those who are very involved in the construction process, frequently have a professional engineer or architect as a representative. Others, such as private or individual clients, may act as their own representatives. Volunteer committees may appoint one individual to liaise with the architect. It is important to establish the client's representative early in the project.

Definitions

Client: A person using the services of a professional (adapted from the *Oxford Dictionary*).

Owner: The person or entity identified in the agreement. The term "owner" means the owner or the owner's authorized agent or representative as designated to the contractor in writing, but does not include the consultant (from CCDC 2, *Stipulated Price Contract*).

Checklist and Guidelines: Issuing Requests for Proposals (RFPs)

This checklist is to be used as a guide for the building owner or client who needs to select an architect. The checklist describes the recommended process that you, as the client or owner, should follow when issuing a **Request for Proposals** (RFP). The checklist is based on principles commonly found in Comparative Selection or Quality Based Selection (QBS). For large or complex projects, you may decide that Technical Proposals are also required. The process for requesting and evaluating these technical proposals is described in step 11 and, if required, should occur following step 6.

Note 1: An excellent primer for choosing and engaging an architect can be found on the website of the Royal Architectural Institute of Canada at www.raic.org (click on Architecture and Architects, then Choosing an Architect)

Note 2: Another reference, with sample forms for use with Quality Based Selection process, may be downloaded from the Ontario Association of Architects website: www.oaa.on.ca (click on Find an Architect, then Selecting an Architect)

Note 3: Most of the provincial associations of architects include within their websites information on **Finding an Architect** *and on* **How to Find, Select, and Engage an Architect using Quality Based Selection (QBS)**

1. Describe the **Scope of Work** (refer to Quality Based Selection Form A-1):
   - ❑ your (the client's) name, including a short history of your organization or agency and the events that prompted the project;
   - ❑ project name and location;
   - ❑ name of contact person: the only person authorized to respond to requests for clarifications or project information;
   - ❑ names and roles of selection committee members (such as board, staff, committee, citizen group);
   - ❑ other construction on the same site, but not part of this RFP;
   - ❑ completed studies or surveys relevant to the project, which will be made available to short-listed architects prior to their interviews;
   - ❑ further studies required prior to commencement of design;
   - ❑ program of requirements describing the intended size, function and occupancy;
   - ❑ any other requirements such as demolition, additions, renovations, or sustainable design criteria, land use or site selection considerations;
   - ❑ anticipated budget (if known);
   - ❑ anticipated form of project delivery or construction procurement (if known);
   - ❑ anticipated schedule for design, construction and occupancy;
   - ❑ any additional or unique requirements;
   - ❑ description of the architect selection process (as indicated in 2 below).

2. **Establish policies, procedures and time frame for the Selection Process** (refer to Form A-2).
   You (the client) should:
   - ❑ be prepared to commit adequate time and resources to evaluate submissions thoroughly;
   - ❑ select and invite appropriate and competent individuals to serve on the selection committee and confirm their availability on the dates chosen;
   - ❑ for large or complex projects, give serious consideration to retaining an architect to aid in preparing the selection process and time frame;
   - ❑ determine criteria for evaluating Expressions of Interest and for weighting and scoring proposals;
   - ❑ confirm that late submissions will not be accepted.

3. **Compile List of Architects** to be invited to submit Expressions of Interest:
   - ❑ consider the number of firms which can reasonably be evaluated;
   - ❑ obtain architects' names:
   - ❑ from the RAIC website (refer to "*Find an Architect*") or from the RAIC printed directory;
   - ❑ from the directory (online or printed) of the provincial licensing body;
   - ❑ by advertisement in local or national newspapers, or professional journals;
   - ❑ by consulting colleagues for their recommendations, when appropriate.

   [Note: The list may be developed based on the architects' geographic location, or if appropriate, a broader representation.]

4. **Request Expressions of Interest** (refer to Form A-3). The following steps should be taken:
   - ❑ prepare a memo, addressed in alphabetical order, to all architects selected for invitation;
   - ❑ list all information required to be included with each architect's Expression of Interest;
   - ❑ attach statements describing scope of the work (Form A-1) and time frame (Form A-2);
   - ❑ state the maximum number of pages to be provided by the architect in a Expression of Interest (usually 3-5 pages);
   - ❑ authorize the contact person to provide names of persons on the selection committee, if requested;
   - ❑ ensure that each invited architect receives exactly the same information.

5. **Evaluate Expressions of Interest**, ensuring that you:
   - ❑ return, unopened, any submissions delivered after deadline;
   - ❑ thoroughly review all Expressions of Interest based on pre-determined criteria.

6. Establish a **Short List**, by:
   - ❑ contacting references;
   - ❑ developing a short list of three to five architects who will be invited to submit Technical Proposals and/or to be interviewed and notifying them;
   - ❑ contacting architects not short-listed, expressing appreciation for their efforts and naming those who have been short-listed (refer to Form A-4);

   [Note: Decide whether or not the definition and complexity of project justifies requiring short-listed architects to submit Technical Proposals or to proceed directly to interviews] (refer to step 11 below on procedures for obtaining Technical Proposals).

7. **Inform Short-listed Architects** (refer to Forms A-5, A-6 and A-7). You should:
   - ❑ establish a date for tour of site, if appropriate, or provide short-listed architects with site surveys and directions to visit site independently;
   - ❑ ensure that all short-listed architects receive exactly the same information arising from any questions;
   - ❑ provide, to all short-listed architects, a list of interview criteria and questions, explanation of scoring and selection process, the date, place and time for interviews and the names and titles of members of the interview committee. *[Note: Advance availability of this information ensures consistent and fair comparisons of all candidates];*
   - ❑ do not request sketches, cost estimates or suggested compensation;
   - ❑ distribute feasibility studies or other reports, project functional program, or other background information to each short-listed architect or notify them where the documents are available for their review.

8. **Interview Short-listed architects:**
   The purpose of the interviews is to:
   - ❑ eview the architects' expertise and relevant experience;
   - ❑ evaluate their management approach, design personnel and consultants;
   - ❑ compare different approaches to the design process, interpretation or understanding of the specific requirements of your project and compatibility with your expectations;
   - ❑ explore issues relevant to the particular project, without being compromised by pre-conceived design solutions.

Direct interaction between the client/user and the architect is essential for the development of a design that fully meets your (the owner's) needs, therefore it is important for the project's intended users to participate in the interviews. Interviews may take place in the offices of short-listed firms or, alternatively, in your own premises.

You, the client, should:

- ❑ only interview the architects who have been short-listed;
- ❑ not consider sketches or other design work if such material is presented during the interview. At this early stage, architects will not yet have engaged in the essential interaction between architect and client which must precede the development of a valid design solution;
- ❑ not discuss the architects' compensation during these interviews;
- ❑ discuss in advance with each short-listed architect what presentation facilities they may require and confirm whether the interview room has adequate requirements (can be blacked-out, projector screen, internet connection or other);
- ❑ if possible, provide two similar interview rooms so that one group can set up equipment while another group is being interviewed;
- ❑ schedule 45 minutes for each architect's presentation, questions and answers, with 15 minutes between interviews, which allows time for the interview committee to discuss their initial impressions privately before the next interview begins;
- ❑ schedule all interviews on one day (or on consecutive days, if that is not possible) to assist the committee to achieve its objective of comparing all presentations consistently and fairly.

9. **Ranking the Short-listed architects:**
   - ❑ rank each architect using the weighting and scoring established earlier;
   - ❑ summarize scores on Group Interview Evaluation Form A-7, to determine ranking in order of preference and to document a record of the selection process;
   - ❑ inform the architects of the committee's decision on ranking as soon as possible, indicating that negotiations will commence immediately with the highest-ranked architect.

10. **Negotiate an agreement with the highest-ranked architect:**
    You, the client, should develop a detailed, comprehensive scope of services jointly with the highest-ranked architect, following which the architect will submit a detailed project work plan (a plan that itemizes the schedule for architectural services, key milestones and deliverables), listing consultants and the role and responsibilities of all members of the design and client teams.

    - ❑ Refer to the following documents for a complete list of architectural services can be found in the Canadian Handbook of Practice for Architects, *Chapter 2.1.10, Architectural Services and Fees*:
      - **Checklist: Scope of Services**
      - **Checklist: Supplemental Architectural Services**

    - ❑ Once the scope of services and work plan are agreed to, the architect will submit a compensation proposal for review and negotiation, referring to the Canadian Standard Form of Agreement between Client and Architect. Note that the architect's compensation can be:
      - a percentage of construction cost,
      - a fixed fee,
      - based on hourly rates, or
      - a combination of the above;

    (Reimbursable expenses are additional and should not be considered in the evaluation).

    - ❑ Negotiate the scope of services and compensation with one architect at a time; if negotiations cannot be successfully completed with the first-ranked architect, they are abandoned, and negotiations begun with the second-ranked architect. Once agreement is reached, incorporate all the negotiated details into a written contract, which protects the interests of both client and architect.
    - ❑ Finally, notify all the short-listed architects who were not selected, indicating the order of final ranking, using Form A-11.

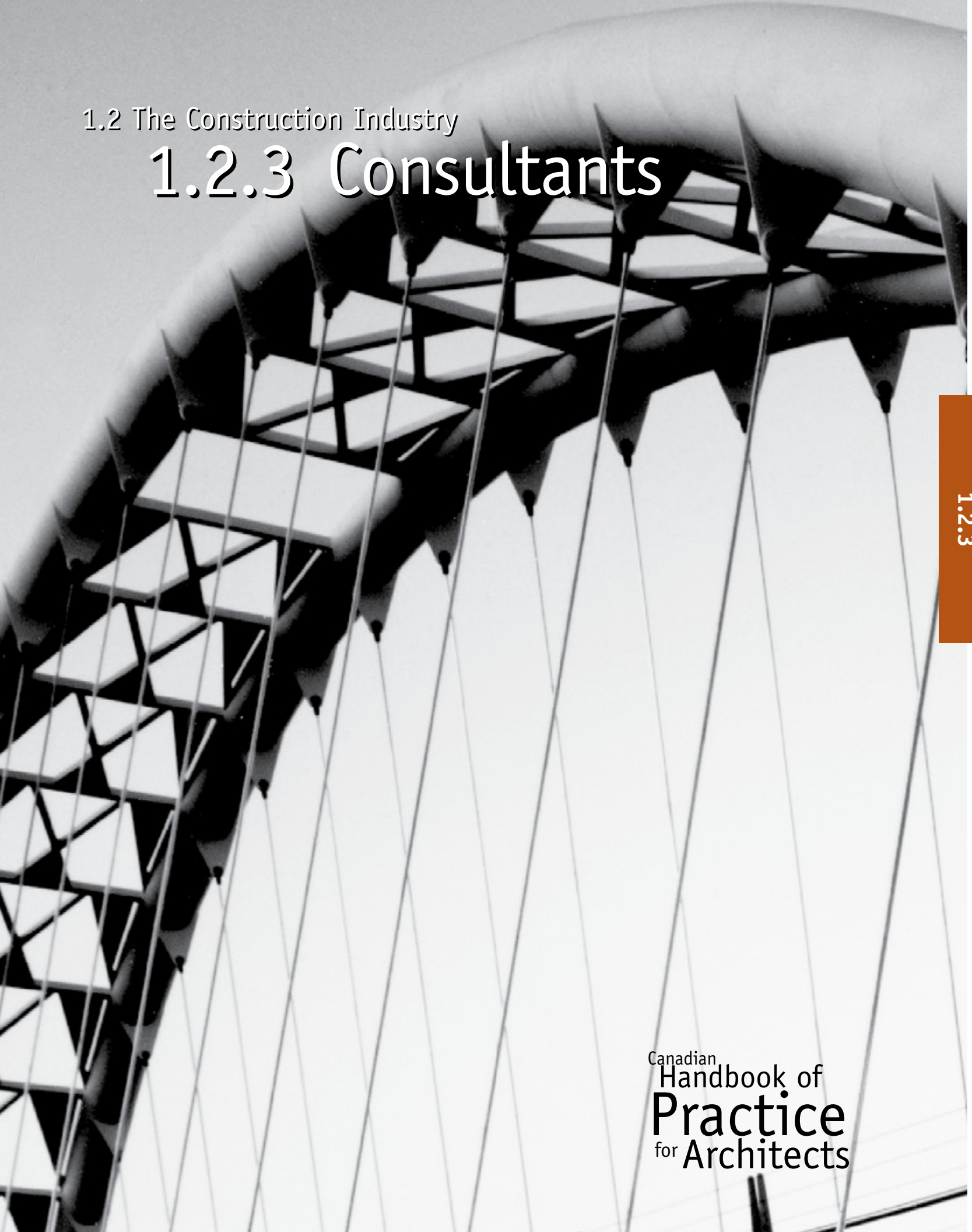
11. **Technical Proposals:** *follow these additional procedures if the definition and complexity of your project justifies requiring short-listed architects to submit Technical Proposals:*
Be aware that the preparation and evaluation of Technical Proposals will require the commitment of significant expense and time for each short-listed architect as well as for your technically experienced staff (or if they are not available, the engagement of specialist consultants).

    If you have concluded that Technical Proposals are required, ensure that the request:
    - ❑ includes all technical areas to be addressed (refer to Form A-8);
    - ❑ establishes a reasonable and appropriate maximum length for the submission;
    - ❑ lists interview criteria and questions;
    - ❑ provides an explanation of the scoring and selection process, the date, place and time for interviews and the names and titles of members of the interview committee.

    (Advance availability of this information gives the best possible assurance that consistent and fair comparisons between candidates will be made).

Review of Technical Proposals should precede interviews (steps 7 and 8) unless, you are already familiar with all the short-listed architects, their staff and their consultants, in which case, you may determine that interviews will not be necessary. Ensure that the Technical Proposals have been reviewed and scored before the interviews take place, leaving time for clarifications during the interview and incorporate the results of the review and ranking of Technical Proposals (recorded on Forms A-9 and A-10) into overall ranking.

1.2.3 Consultants



1.2.3

Introduction

Types of Consultants
- Engineering Consultants
- Specialist Consultants

Agreements with Consultants

Managing and Coordinating Consultants

Consultant Associations
- Association of Consulting Engineers of Canada (ACEC)
- Construction Specifications Canada (CSC)

Testing Agencies and Inspection Services

Definitions

References

List: Types of Consultants on the Design Team

List: Selected National Associations of Consultants

Checklist: Coordinating Consultants

Consultants

Introduction

Architects are required to provide a wide range of services and expertise in the course of designing and coordinating a building project, and they usually do so with the help of consultants. Projects in which the architect is the sole individual responsible for design are rare, with small residential and commercial projects probably the only examples. The size, scope of services, or complexity of the project usually exceed the architect's qualifications, skills or ability, making it necessary to seek the expert advice of others. The kind and amount of expertise required will vary with each building type or building classification and with the size and scale of the project.

A significant part of the practice of architecture, therefore, involves the coordination of information, advice, and designs provided by consultants who are knowledgeable in various fields. The architect usually provides the leadership, as well as the management and coordination skills, to synthesize the services of various consultants.

Whether acting alone or with numerous consultants, the architect's goal is to provide seamless service to the client, in addition to well-coordinated construction documents and a smooth execution of the construction or project delivery. Consultants are full participants in the **design team**.

It is now common for the architect and the consultants to work together from the very begininning of a project through an Integrated Desgn Process to achieve the best sustainable design solutions.

Types of Consultants

Architects engage a wide variety of consultants. Some are professionals licensed under statute, such as engineers, who must meet rigorous requirements for membership in professional associations (see "Consultant Associations" below), as do architects. Others provide technical services such as CAD drafting or advice on hardware. Still others may be specialists in a particular field such as landscape architecture, marketing, interior design or kitchen equipment.

Engineering Consultants

The consultants most often engaged by architects are structural, mechanical, and electrical engineers. These engineers could be considered **basic** consultants. Architects are usually engaged by the client as **prime** consultants for most building classifications (building codes classify buildings by major occupancies). The exception is industrial building projects, where the prime consultant is typically an engineer.

In Québec, the engineers are usually engaged directly by the client. There is usually no contractual link between architects and engineers.

There are firms in Canada with some or all of the basic engineering consultants and architects within one organization. Such multi-disciplinary firms are not common in Québec.

Other engineers frequently consulted for building projects are acoustical engineers, civil engineers, and engineers who specialize in the science of building envelopes. Others include geotechnical engineers, seismic engineers, traffic engineers, and environmental remediation engineers. Geotechnical and environmental remediation

engineers and certain other specialists (such as land surveyors) should be retained directly by the client because architectural professional liability insurance policies do not typically cover these services.

Specialist Consultants

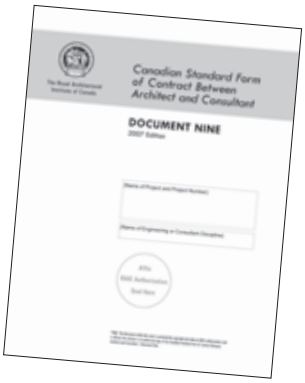
Building projects often require specialist consultants. Many of them are members of an association or may be certified to perform their services. This is typical of specification writers, building envelope consultants, interior designers in certain jurisdictions, and others. Some consultants gain expertise through years of specialization and experience. Many architects become specialist consultants themselves. Refer to "List: Types of Consultants on the Design Team" at the end of this chapter.

Agreements with Consultants

The architect should execute a written agreement with all consultants that he or she directly engages. Before such an agreement is executed, the architect should confirm that each consultant can meet both the requirements of the client and the architect. These include:

- licensing requirements in the jurisdiction of the project;
- professional liability insurance requirements;
- capacity to perform the services;
- ability to meet the project time schedules and budget.

The use of the *Canadian Standard Form of Contract Between Architect and Consultant: RAIC Document Nine* is recommended for an agreement with engineering consultants and other design professionals such as other architects, landscape architects, interior designers, and food service consultants. Document Nine is **not** a "stand-alone" agreement and it is expected that the "prime agreement" (RAIC Document Six or Seven), or alternatively the relevant portions of the prime agreement, be appended to it. This ensures that the consultants have a full understanding of the expected and required services.


Canadian Standard Form of Contract Between Architect and Consultant

DOCUMENT NINE

The architect should prepare a separate agreement for other consultants such as those with a limited role, who may not carry professional liability insurance and who may not be design professionals. This agreement should clearly outline the services required as well as the fees for these services, and may have to include clarification on the ownership of the copyright. The architect should ensure that the copyright on the limited consulting services provided for an architectural project is assigned in writing to the architect.

Managing and Coordinating Consultants

One of the architect's important roles is to manage and coordinate the work of consultants, whether they are retained directly by the architect or separately by the client. It is important to start the process early and to obtain input from the consultants through an Integrated Design Process starting prior to schematic design. Also, it may be helpful to involve certain consultants in project planning and budgeting prior to commencing design work. Consultants usually work as independent professionals with a significant degree of freedom. However, during the entire course of the project, the architect:

- monitors consultant performance;
- ensures consultants' ongoing commitment to the project;
- motivates consultants;
- provides recognition to consultants.

The coordination of consultants may also include:

- identifying project goals and environmental design targets;
- establishing budgets, design criteria, and time schedules;
- arranging meetings;
- routing all communications;

- setting standard formats for documentation (primarily working drawings and specifications).

Refer to "Checklist for the Management of the Architectural Project" in Chapter 2.3.1, *Management of the Project*, for a list of tasks required to coordinate and manage consultants at each phase of the project.

Consultant Associations

Most of the specialists which an architect consults are organized into professional, para-professional or technical associations. Because of the large number of such associations in Canada, this Handbook will outline only those associations which participate on the Construction Industry Consultative Committee (CICC) and the Canadian Construction Documents Committee (CCDC). These four associations are:

- Association of Canadian Engineering Companies (ACEC);
- Canadian Construction Association (CCA);
- Construction Specifications Canada (CSC);
- Royal Architectural Institute of Canada (RAIC).

Refer to Chapter 1.2.1, *The Construction Industry,* for the composition and role of the CICC and the CCDC, as well as for a description of the Canadian Construction Association (CCA).

Refer to Chapter 1.1.4, *The Organization of the Profession in Canada,* for a description of the Royal Architectural Institute of Canada (RAIC).

The ACEC and the CSC are discussed below.

Association of Canadian Engineering Companies (ACEC)

Founded in 1925, ACEC is the national association of consulting firms that provide engineering and other technology-based intellectual services to the built and natural environment. Member companies offer professional engineering services world wide to private sector and government clients. ACEC's mission is to promote and safeguard the business and professional interests of the Canadian consulting engineering industry in Canada and abroad.

The Association's membership consists of approximately 600 independent consulting engineering firms and 11 provincial and territorial member organizations. Members range in size from single-person operations to multi-national companies.

Refer to "List: Selected National Associations of Consultants," located at the end of this chapter, for the ACEC's address and Web site.

Construction Specifications Canada (CSC)

Construction Specifications Canada (CSC) is a national multi-disciplinary, non-profit association with chapters across Canada. CSC is committed to ongoing development and delivery of quality education programs, publications and services for the betterment of the construction community.

CSC liaises with its sister U.S. organization, the Construction Specifications Institute (CSI), and works with the CSI to develop and maintain the MasterFormat™ system.

CSC publishes *Construction Canada* magazine and the TEK-AID series of reference documents which can assist architects in developing specifications. CSC also offers a variety of certification programs, including:

- the Certified Construction Contract Administrator (CCCA);
- the Certified Technical Representative (CTR);
- Registered Specification Writer (RSW).

Refer to "List: Selected National Associations of Consultants," located at the end of this chapter, for the CSC's address and Web site.

Testing Agencies and Inspection Services

During the construction administration phase of a project, architects occasionally require expertise to test components of the construction (such as the compaction of sub-soils, concrete samples) or to conduct detailed inspections (for roofing systems, welds, piping, etc.). This expertise is discussed in Chapter 2.3.11, *Contract Administration — Field Functions*.

Refer also to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*.

Definitions

Consultant: One from whom advice is sought. The requirements for licensing vary depending on the professional field of activity. (adapted from *Carson's Construction Dictionary*)

Engineer: A professional skilled in the design, development, and construction of physical works. To practise or hold oneself out to the public as an engineer, the individual must be licensed under provincial or territorial legislation.

Prime Consultant: The consultant that is retained directly by the client for the provision of the main part of professional services; these services usually include management and coordination of sub-consultants and other consultants engaged directly by the client or others.

Sub-consultant: The consultant that is retained by (or under contract to) the prime consultant.

References

Construction Specifications Canada. *Construction Canada*. Published six times a year. Toronto, Ont.

RAIC Document Nine - Canadian Standard Form of Agreement Between Architect and Consultant: Ottawa, Ont.

List: Types of Consultants on the Design Team

Specialist Consultants:

- Acoustical consultant
- Airport consultant
- Architectural historian
- Art consultant
- Building code consultant
- Building envelope consultant
- Computer or CAD consultant
- Conservation or Heritage architect
- Construction manager
- Cost consultant
- Demographer
- Economist
- Education consultant
- Elevator consultant
- Energy management consultant
- Environmental consultant or ecologist
- Facilitator
- Facilities manager
- Food service/kitchen consultant
- Graphic artist
- Hardware consultant
- Information Technology consultant
- Hospital consultant
- Interior designer
- Laboratory consultant
- Land surveyor
- Landscape architect
- Lighting consultant
- Marketing consultant
- Programmer
- Psychologist
- Public relations consultant
- Quantity Surveyor
- Realtor
- Scheduling Consultant
- Security consultant
- Signage or graphics consultant
- Sociologist
- Specifications writer
- Sustainability or LEED® Consultant
- Technologist
- Theatre consultant
- Translator
- Transportation planner
- Urban and regional planner
- Urban designer
- Value engineering consultant
- Wayfinding consultant
- Wind/snow studies consultant

Engineering Consultants:

- Acoustical engineer
- Civil engineer
- Electrical engineer
- Environmental engineer
- Geotechnical engineer
- Hydrological engineer
- Mechanical engineer
- Process engineer
- Seismic engineer
- Structural engineer
- Traffic engineer

List: Selected National Associations of Consultants

Association of Canadian Engineering Companies (ACEC)
616-130 Albert Street
Ottawa, Ontario K1P 5G4
Tel: (613) 236-0569
Fax: (613) 236-6193
www.acec.ca

Canadian Construction Association (CCA)
75 Albert Street
Ottawa, Ontario K1P 6A4
Tel: (613) 236-9455
Fax: (613) 236-9526
www.cca-acc.com

Engineers Canada
180 Elgin St., Suite 1100
Ottawa, Ontario K2P 2K3
Tel: 613-232-2474
Fax: 613-230-5759
www.engineerscanada.ca

Canadian Institute of Quantity Surveyors (CIQS)
90 Nolan Court, Unit 19
Markham, ON L3R 4L9
Tel: 905-477-0008
Fax: 905-477-6774
www.ciqs.org

Canadian Society of Landscape Architects (CSLA)
P.O. Box 13594
Ottawa, Ontario
K2K 1X6
Tel: (613) 622-5520
Fax: (613) 622-5870
www.csla.ca

Construction Specifications Canada (CSC)
120 Carlton Street, Suite 312
Toronto, ON, M5A 4K2
Tel (416) 777-2198
Fax (800) 668-5684
www.csc-dcc.ca

Interior Designers of Canada (IDC)
220 - 6 Adelaide Street East
Toronto, Ontario, M5C 1H6
Tel: 416.594.9310
Fax: 416.921.3660
www.interiordesigncanada.org

Checklist: Coordinating Consultants

Notes
'Sub-consultants' include consultants engaged by the architect, such as structural, mechanical & electrical engineers, landscape architects, and other specialists. *[In Québec, engineers are usually engaged directly by the client.]* Consultants which may be engaged by the architect on behalf of the client but whose fees are paid by the client, either directly or through allowances, are often included in the contract price. Examples are land surveyors, geotechnical engineers, testing and inspection firms.
For convenience, these are all referred to as 'consultants' in this Checklist.

This Checklist is based on the traditional contractual arrangement where the client engages the architect, who then engages the necessary sub-consultants. The relationship between architect and sub-consultants is constrained when the consultants are engaged directly by the client or when the architect is engaged as a sub-consultant to an engineer who acts as the prime consultant. The basic principles of coordination do not diminish under such alternative contractual arrangements and should be affirmed and clarified by the architect as early as possible.

Comments, clarifications or recommendations are in *italics*
Use of a forward slash (/) signifies *and* or *or*

Refer also to Chapter 1.2.3 *Consultants* and "Checklist for the Management of the Architectural Project" in Chapter 2.3.1 *Management of the Project*

Pre-agreement

1. Define expectations:

(may apply only to contracts where consultants are engaged as sub-consultants to the architect)

- ❑ Before beginning negotiations with potential consultants prepare clear definition of expected consultant performance for each discipline, including:
  - extent of participation by consultant during design/documentation stages
  - knowledge of/commitment to current practice in:
    - energy efficiency
    - sustainable design and integrated design approach
- ❑ contract administration procedures, including:
  - reporting
  - review of change quotations
  - shop drawing review
- ❑ field review practices, such as:
  - attendance at site meetings
  - prohibition of deal-making recorded/ unrecorded
  - written records/reports
- ❑ review past performance of previously engaged consultants
- ❑ review unsolicited offers of service from consultants not previously engaged
- ❑ seek confidential recommendations on unfamiliar consultants from colleagues/clients
- ❑ prepare short list of consultants selected (formerly engaged/new) to interview
- ❑ develop score sheet for use during first interviews for consistent recording/rating of consultants' responses

2. Interviews:

(*separate preliminary discussions with each of selected consultants to confirm that consultant understands/accepts architect's performance expectations*)

- ❑ encourage consultant to describe his or her procedures in dealing with architects
- ❑ explore consultant's understanding of collaborative/participatory process
- ❑ clarify how architects use the word 'design': (*engineers apply a different meaning to the word, which can lead to serious misunderstandings. Some engineering consultants may be unable, or reluctant, to comprehend the architect's expectation that the engineer should participate in/contribute to the design development of the project*)
- ❑ confirm adequate professional liability insurance
- ❑ make notes on score sheet

3. Following Interviews:

- ❑ review score sheets for each consultant
- ❑ eliminate unsuitable consultants
- ❑ prepare formal Request for Proposals (RFP) letter for selected list of consultants
- ❑ *different letters will be required for each discipline, but each should include:*
  - statement of expectations, confirming topics presented during interview (*performance expectations should be stated in detail in initial RFP letter*):
    - description of project, giving as much information as possible:
    - project name/client/location site
    - program
    - budget
    - target date for completion
- ❑ proposed schedule for design/documentation/ bidding & negotiation/construction
- ❑ fee basis, such as:
  - lump sum
  - percentage
- ❑ [task-based *using procedures set out in Mastering the Business of Architecture, published by the OAA*]
- ❑ request to confirm/provide:
  - acceptance of performance expectations
  - ability to meet timetable
  - proof of professional liability insurance

4. Appointment of consultants:

- ❑ review proposals
- ❑ verify acceptance of expectations/adequate professional liability insurance
- ❑ analyse any additional conditions agree or reject
- ❑ accept best proposal (*may not be the cheapest if expected performance/understanding are superior*)
- ❑ notify successful consultants/sign formal agreements (RAIC Document Nine –Canadian Standard Form of Contract Between Architect and Consultant)
- ❑ advise unsuccessful consultants (*this maintains good relations: you may want to consider engaging them in future)*
- ❑ include selected consultants in:
  - proposal to potential client when responding to an RFP or
  - notification to client when already engaged

Schematic Design:

- ❑ First meeting with consultants:
  - (*preferably with all three engineering disciplines present so that architect's expectations for coordination between consultants, as well as between each consultant and architect, can be stated/ confirmed to all parties together)*
- ❑ clarify how architects define 'design' *in order to develop effective design solutions for the project, there must be positive participation and constructive input from all consultants throughout the project development process*
- ❑ confirm project schedule/deadlines:
  - emphasize importance of meeting deadlines, particularly during documentation
  - consequences of consistent failure to meet deadlines (*significant delay could result in penalties*)
- ❑ review program/budget/client's system preferences (*some clients, such as school boards, may have preferences for specific mechanical systems*)
- ❑ general discussion of design principles
- ❑ discuss/agree whether to recommend that client consider alternative mechanical systems
- ❑ review further site information required:
  - geotechnical investigation
  - topographical survey
  - existing municipal services/utilities
  - existing structures
- ❑ instruct consultants to:
  - review all information received from architect
  - examine site
  - make thorough site audit of existing facilities for renovation projects
  - (*relying on original documents without site verification is not acceptable*)
- ❑ establish dates for subsequent design meetings (to be held on a regular basis (*weekly/ biweekly/monthly*); the number/frequency governed by size/complexity of project)

Design meetings:

[Note: architect chairs and records all meetings: complete and issue minutes to all present within 48 hours and copy all minutes of meetings to client]

- ❑ consider arranging meetings with each consultant separately, scheduled consecutively with some overlap to permit joint discussion of related issues and, later, coordination between consultants: (*logical sequence might be structural/ mechanical/electrical*)

- ❑ review consultants' preliminary concepts: encourage constructive input from each consultant
- ❑ assign topics for preliminary investigation, such as:
  - alternative structural systems
  - mechanical systems:
- ❑ instruct consultant to review/cost alternative systems as required (if architect and consultant agree to recommend a more energy efficient/ sustainable system to client, schedule preliminary meeting to review proposal with client to be attended by architect and consultant)
- ❑ prepare report/analysis for presentation to/ discussion with client
- ❑ review potential coordination issues and estimates of construction cost for work of each discipline
- ❑ monitor each consultant's progress and advise promptly if performance is not satisfactory

Design Development:

- ❑ continue regularly scheduled meetings/ minutes *[Note: architect chairs and records all meetings: complete and issue minutes to all present within 48 hours and copy all minutes of meetings to client]*
- ❑ report all relevant matters arising from design meetings with client:
  - data on specialized systems *(refer to list in "Checklist for the Management of the Architectural Project" (page 7, item 9) Chapter 2.3.1)*
- ❑ review/resolve coordination issues on an going basis
- ❑ instruct structural consultant to:
  - investigate/confirm in writing a review of all applicable codes/regulations
  - update construction cost estimates
  - prepare preliminary/outline specifications
- ❑ instruct mechanical/electrical consultants to:
  - obtain written approval for all service connections from utilities/Authorities Having Jurisdiction
  - investigate/confirm in writing a review of all applicable codes and utility/public regulations
  - review architectural/structural schematic drawings to establish/confirm adequate space provision for all systems
  - prepare written description of design principles for review by architect *and, when appropriate, client*
  - prepare schematic drawings of mechanical rooms showing layout of major equipment
  - indicate proposed locations/dimensions of all built-in components
  - update construction cost estimates
  - prepare estimates of operating costs
  - prepare preliminary/outline specifications
- ❑ monitor each consultant's progress: advise promptly if performance is not satisfactory

Construction Documents:

1. Establish timetable/procedures/deadlines:
(reiterate importance of meeting deadlines/ consequences of consistent failure to do so).

- ❑ confirm documentation standards:
  - electronic distribution and printing protocols
  - layering system
  - sheet size/title block/numbering system *same date on all documents*
  - specification format
- ❑ all parties commit to provide information on schedule
- ❑ progress drawings transmitted electronically weekly from consultants to architect for review:
  - instruct consultants to transmit selected relevant drawings to other consultants for their review *as required*
  - updated outline floor plans transmitted by architect to consultants
  - other relevant drawings transmitted by architect to consultants *as appropriate*

2. Coordination Meetings
(attended by all consultants):
[Note: architect chairs and records all meetings: complete and issue minutes to all present within 48 hours and copy all minutes of meetings to client]
(The frequency of coordination meetings may be reduced by effectiveness of electronic transfer of documents between parties)

- ❑ resolve coordination problems
- ❑ review all changes by each discipline regularly
- ❑ monitor/ensure that most recently updated plans are in use by consultants
- ❑ monitor each consultant's progress: advise promptly if performance is not satisfactory
- ❑ instruct consultants to:
  - submit design calculations, reviewed/ stamped by licensed engineer responsible for each discipline, for project record files/ forwarding to Authorities Having Jurisdiction *as required*

- determine required cash allowances *for inclusion in Division 1 of specifications*
- prepare final specification Sections/ Divisions for each discipline
- submit final documents to architect/other consultants for final coordination review (*recommended **minimum** time: two weeks before bid date)*
- prepare final construction cost estimates
- assist architect in advising client on selection of testing & inspection agencies
- assist architect in evaluation of pre-qualification submissions from interested bidders *as required*

❑ check completed documents for coordination/ accuracy: promptly instruct consultants to make revisions required

❑ instruct consultants to seal and sign their documents

Bidding & Negotiation:

❑ instruct consultants to attend pre-bid meeting/ site tour *as required*

❑ consultants' response to questions from bidders:
- may be received directly from relevant subtrades, *or*
- forwarded from architect
- record all answers to facilitate preparing addenda in a timely manner

❑ conform to specified substitutions policy:
- *(recommended practice is to require all proposed substitutions to be submitted for review prior to bid closing, then included in addenda if approved)*

❑ prepare addenda:
- consultants to forward to architect minimum 48 hours before last date stated in Instructions to Bidders to allow architect time to prepare/issue addenda (*if mechanical/ electrical bids specified for submission through a Bid Depository, submission date will be 2 or 3 days earlier than general contractor bid closing)*

❑ after bid opening instruct consultants to:
- assist in evaluation of subtrade/unit/ alternative prices *as required*
- assist in preparation of separate contracts *as required*
- participate in negotiations *as required*

Contract Administration:

1. Office Functions prior to start of Construction:

❑ following documents received from contractor forwarded to consultants for review/comment:
- construction schedule
- schedule for issuing/reviewing shop drawings/samples
- schedule of values

❑ instruct consultants to:
- assist client with applications for gas/ water/electricity/telephone/other services as required

❑ review architect's expectations regarding:
- protecting/supporting the intent of the contract documents
- substitutions policy *refer to Bidding & Negotiation section above*
- no compromises/negotiations without architect's/client's prior approval

2. Field Review:

❑ clarify site visit procedures:
- required attendance at all site meetings *unless no work under way related to a specific discipline*
- review by appropriate discipline (*not acceptable for mechanical engineer to review/report on electrical work, for example)*
- frequency of visits governed by status of work at the site
- all site instructions recorded in writing and copied to contractor/architect immediately

❑ forward written field review reports to architect/ contractor *(architect will submit to client/ Authorities Having Jurisdiction as required)*

❑ emphasize that deal-making will not be tolerated:
- acceptance of changes/substitutions prohibited without prior review/approval by architect *(such approval should be contemplated only in extraordinary circumstances, after client approval)*

❑ monitor each consultant's performance: advise promptly if not satisfactory

3. Office Functions during Contract Administration:

- ❑ lines of communication: remind consultants that all communications must pass through architect to contractor *and vice versa*
- ❑ all discussions/instructions confirmed in writing
- ❑ all instructions/confirmations issued through/by architect *whenever possible: (only exceptions could be urgent field instructions; these must be recorded in writing/forwarded to architect immediately)*
- ❑ shop drawings/samples processing:
  - *architect may choose to instruct contractor to forward structural/mechanical/electrical shop drawings/samples directly to consultants for greater efficiency*
  - *all transmittals copied to architect to note in shop drawing record*
  - *consultants return reviewed shop drawings through architect*
  - *provides opportunity for final review by architect prior to return to contractor*
  - sign and date samples: retain one/return other to architect for forwarding to contractor to retain on site
- ❑ changes/supplemental instructions:
  - prepare supplemental details/instructions *as required*
  - evaluate quotations for changes in contract sum/time forwarded by architect for review
  - superficial review/routine acceptance of charges/unit prices not acceptable
- ❑ review/follow up on field review reports
- ❑ review/comment on contractor's updated progress schedule *as required*
- ❑ review of monthly draws: evaluate work performed/materials supplied in relation to contractor's progress applications

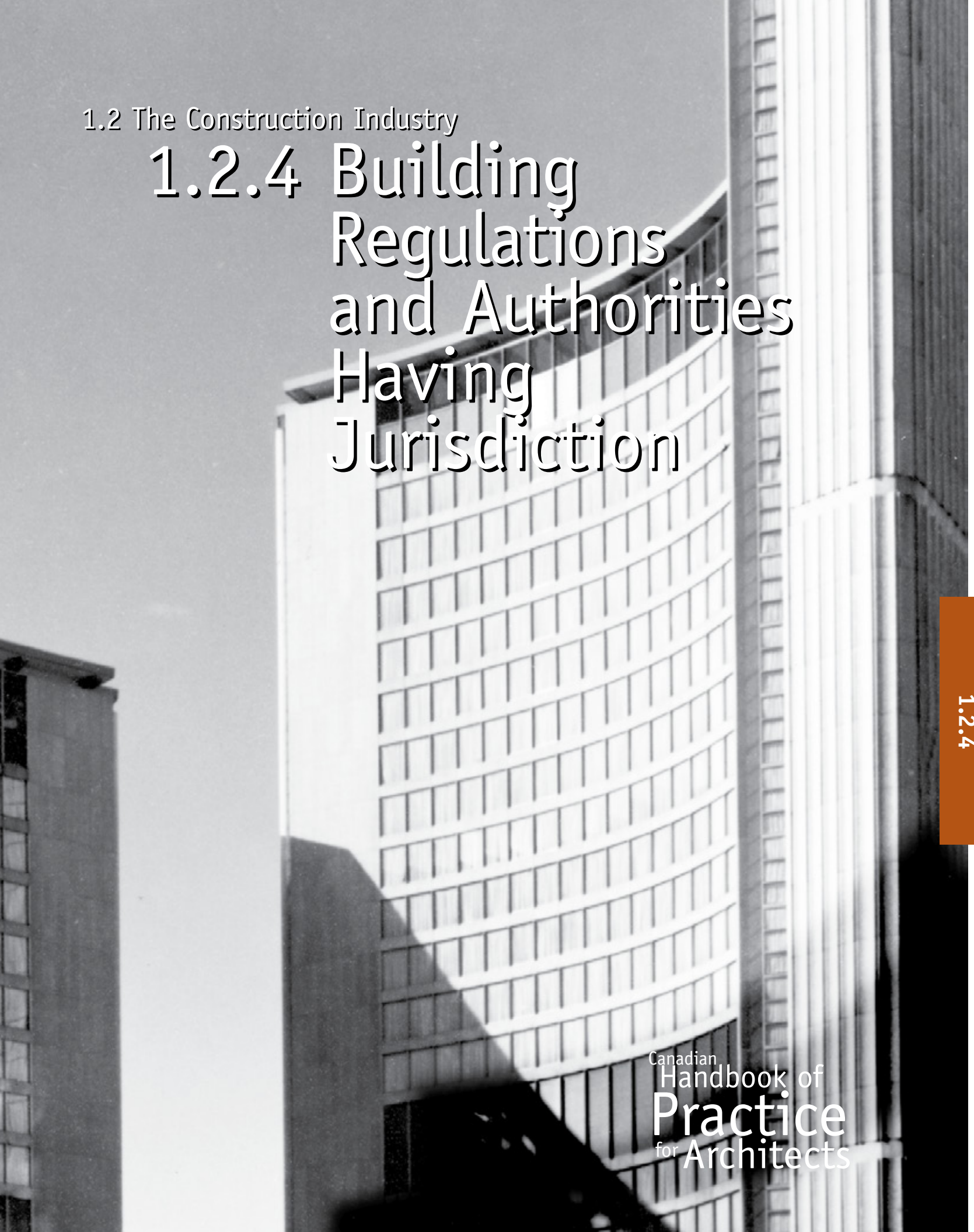
4. Project Take-over:

- ❑ prepare deficiency lists: follow up when contractor reports that deficiencies completed
- ❑ attend equipment demonstrations
- ❑ carry out substantial performance site visit:
  - report findings to architect
- ❑ review relevant submissions, including:
  - warranties
  - inspection certificates
  - manuals
  - operating instructions
- ❑ carry out final site visit
- ❑ update statement of design principles for presentation by architect to Owner
- ❑ provide description of systems
  - how they work, including:
    - zoning
    - sustainability
    - energy consumption
    - maintenance requirements
    - probable life expectancy of components before replacement will be required
- ❑ prepare record drawings *as required*

Post-construction:

- ❑ review reported defects during warranty period
- ❑ carry out review of all reported defects/deficiencies prior to expiry of one-year warranty period
- ❑ assist architect to administer corrective action by contractor where defects/deficiencies occur within extended warranty period(s)

1.2.4 Building Regulations and Authorities Having Jurisdiction



Introduction

The Role of Authorities
- Building Codes and Regulations
- Enabling Legislation
- National Building Codes
- The Building Permit and Inspection Process
- Building Officials

Relationships with Authorities
- The Authority and the Client
- The Authority and the Architect
- The Authority and the Contractor

Approvals

Definitions

References

Appendix — Examples of Typical Approval Processes and documentation from the City of Mississauga

Checklist: Federal Authorities Having Jurisdiction

Checklist: Provincial Authorities Having Jurisdiction

Checklist: Regional and Municipal Authorities Having Jurisdiction

Building Regulations and Authorities Having Jurisdiction

Introduction

The architect's duty to the public is implemented, in part, by interpreting and complying with building regulations. Every project undertaken by an architect is subject to a maze of statutes, codes, standards, and bylaws. It is not uncommon for a project to be regulated by several levels of government (municipal, provincial and/or federal) as well as by First Nations, regional or metropolitan governments.

The numerous government requirements will vary from project to project. A few examples are the regulations governing:

- hospitals, theatres, nursing homes, hotels, and office and industrial buildings;
- toxic and hazardous materials;
- air, noise, and water pollution;
- fire, construction safety, and public health;
- seismic performance;
- accessibility for persons with disabilities.

Refer to the Checklists at the end of this Chapter for more examples.

The architect must have a general understanding of the complete regulatory environment, even though some regulations may not directly affect architectural services or the design process. For example, although construction safety regulations apply strictly to the contractor and to the operation of the construction project, and as such are the responsibility of the contractor, the architect must be aware of these regulations and the accompanying responsibility.

Certain environmental assessment requirements may demand soil or archaeological studies, which could have an impact on the project funding, schedule, and costs. The architect should be familiar with any such regulations, indeed, all regulations pertaining to the project. In addition, the architect should know which Authorities Having Jurisdiction are responsible for the administration of the regulations.

This chapter explains the role of building regulations and their administration by Authorities Having Jurisdiction, and suggests how the architect can work effectively with them.

The Role of Authorities

Building Codes and Regulations

Construction of sound, safe buildings and structures is fundamental. Building codes and regulations provide these minimum safety standards.

Most codes and regulations were established to protect the public, that is, to prevent and mitigate such hazards as structural collapse, fire, accidents, and disease.

Some regulations ensure safe buildings by requiring an adequate supply of potable drinking water, sanitary conveniences, minimum spatial dimensions, and illumination levels, and other features which affect the building design. However, not all regulations govern building safety. A municipal zoning bylaw or land-use regulation, for example, regulates land use and density as well as the bulk, height, and location of buildings. Such a regulation, which is intended to govern the planned and orderly development of the municipality, can markedly affect the architectural design of a building.

Building codes often adopt standards set by public and private organizations. Refer to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*, for more information on standards.

Enabling Legislation

Adopting and enforcing codes and statutes requires federal or provincial legislation. Under the *British North America Act*, and its successor, the *Constitution Act*, responsibility for building regulation rests with the provinces (except for buildings on federal land). Enabling provincial legislation authorizes municipal councils (and others) to appoint staff and assign duties and responsibilities to administer regulations. Sometimes, codes are provincially enacted; sometimes, they are municipal bylaws. The local municipal building official usually administers the building code by means of the building permit and building inspection processes. Building officials are empowered to determine that the erection and maintenance of buildings comply with these regulations.

National Building Codes

The **National Building Code (NBC) of Canada** is a "model" code. The NBC is a code of regulations for public health, fire safety, and structural sufficiency with respect to buildings. It establishes a minimum standard of safety and accessibility for the construction of buildings (including extensions and alterations), the evaluation of buildings involving a change of occupancy, and upgrading of buildings to remove an unacceptable hazard. Serving as a basis for other building codes, the NBC is modified to reflect regional requirements or procedures and then adopted as a provincial or municipal building code.

The **National Fire Code** is also a model code of minimum requirements to ensure an acceptable standard of fire prevention, fire fighting provisions, and life safety in existing buildings and within the community at large. Although life safety is the primary objective of the National Fire Code, it also includes measures of property protection to the extent that they make a direct contribution to life safety and for the purpose of controlling conflagrations or large loss fires.

The **National Plumbing Code** (Part 7 of the NBC) covers the design and installation of plumbing systems in buildings.

The **National Farm Building Code** deals with the particular requirements for farm buildings.

The **National Housing Code** and Illustrated Guide is a compendium of requirements in the National Building Code which apply to detached, semi-detached, and row houses.

The **Model National Energy Code of Canada for Buildings** and the **Model National Energy Code of Canada for Houses** provide standards for the construction of energy-efficient buildings.

These codes are "model" documents only and must be adopted provincially in order to come into effect.

The Canadian Commission on Buildings and Fire Codes (CCBFC) issues the National Building Codes, written by various technical committees and published by the National Research Council of Canada. The NBC has recently introduced "objective-based" requirements to eventually replace the "prescriptive" requirements found in the National Building Code.

The Building Permit and Inspection Process

The client or his/her agent (sometimes the architect) must submit an "application to build" to local building officials, and usually must verify the correctness of the application by a statutory declaration. The application is accompanied by a stipulated number of sets of architectural, structural, mechanical, and electrical documents for the proposed building. Officials review the application for compliance with municipal bylaws, regulations, and the building code. Other municipal bodies — such as fire, planning, health, and public works departments — may also review the application. When the documents are approved, a building permit is issued. The applicant is advised of any non-complying items.

During construction, municipal building officials review the work for general compliance with the approved documents and building codes.

In the case of deviations, revised plans must be submitted to and approved by the building department. Each province has its own system to ensure compliance. For example, Ontario has recently created a Building Code Designation System (BCDS) that requires those who are not architects or engineers to become designated in order to apply for a building permit. Another example is the province of Alberta which engages private sector inspectors.

Building officials are authorized to:

- issue compliance orders;
- stop work until corrections have been made;
- lay charges in the case of serious infractions.

Building officials deal primarily with contractors; however, they are also often in contact with project architects, who must review and confirm that the work generally conforms to the documents forming the basis of a building permit.

Other levels of government may also require the submission of construction documents. These Authorities Having Jurisdiction could include:

- the regional, provincial or federal departments of labour;
- public health departments;
- roads, transportation, and communications authorities;
- the office of the fire marshal.

Building Officials

Building officials:

- require and receive applications to erect, enlarge, alter, demolish or move buildings;
- review plans, specifications, and reports to determine that the proposed work meets all applicable regulations;
- issue a permit to commence construction, when the application is complete and complies with all applicable regulations;
- inspect construction in progress for compliance with the approved documents and applicable regulations;
- report contraventions to the appropriate persons;
- issue orders to correct outstanding contraventions prior to use or occupancy, or sooner where circumstances dictate;
- initiate action according to policy when orders are not carried out within the stipulated time;
- issue a certificate of compliance or a similar document when regulations have been met;
- assess unsafe and inadequately maintained conditions within buildings and order corrective action;
- exercise judgement in the application of regulations;
- keep records as required;
- report regularly to managers and municipal councils;
- review proposals for equivalencies to code requirements.

Building officials must be well-versed in the regulations and their application, and must understand their importance to public safety. They must:

- know the current legislation;
- be aware of changing building technology and its effects;
- have an understanding of what best serves the public interest.

Building officials must also interpret the meaning of the regulations, their current relevancy, and the need for change. To do so, the officials must communicate effectively with:

- the public, to help the public understand regulations and procedures;
- municipal councils;
- design professionals;
- the construction industry;
- associations concerned with public safety in buildings and structures;
- committees and persons who prepare regulations;
- other building officials.

Relationships with Authorities

The client, the architect, consultants, and the contractor may all have to deal with various Authorities Having Jurisdiction.

The Authority and the Client

The client may become directly involved with an authority during the pre-design stages. Experienced clients may also make initial inquiries to the authorities prior to the appointment of an architect, or in conjunction with the architect. The client may apply directly for the building permit.
If a permit is denied, even when all documentation for compliance with zoning bylaws and the building codes is provided, the client should consult the architect. If necessary, legal counsel can be sought.

The following are possible legal procedures affecting the construction of buildings:

- an injunction;
- a mandamus.

An *injunction* is sought when a public body applies to the court for an order restraining a private individual or other body from violating an applicable law. In the construction industry, it is often applied to stop an individual or company from constructing a building contrary to regulations, codes or bylaws. A typical example is a "stop work order."

A *mandamus* is an order directing a public body to exercise a public duty, such as the issuance of a building permit. If a municipality refuses to issue a building permit and forces the client to apply to the court for a *mandamus*, the architect must be sure that all building plans and specifications comply fully with municipal bylaws and building codes.

The Authority and the Architect

For the architect, the most important Authorities Having Jurisdiction are those which administer the zoning and development bylaws and the applicable building code.

Analysis of zoning and code requirements commences early in the design of a project and the architect begins the process of communication with the various Authorities Having Jurisdiction. Together with the sub-consultants, the architect will usually be the prime contact with authorities during the design and contract document stages. Refer to Chapter 2.3.5, *Schematic Design*.

The architect must be thoroughly familiar with the building code. It contains many requirements, in addition to structural ones, which affect the design of the building, such as:

- window openings;
- means of egress;
- design of stairways and their enclosures;
- openings between floors;
- compartmentalization for fire safety;
- accessibility for persons with disabilities;
- travel distance to exits.

Most officials encourage early consultation with architects to clarify zoning bylaws and building code requirements before the construction documents are advanced. In some instances, the local authority requires payment of the permit fee before providing consultation. For major projects, it is advisable to hold a series of meetings with the Authority Having Jurisdiction as the design progresses. Minutes of these meetings should be prepared and distributed. Such consultations will help to encourage cooperation, improve communications, and resolve differences of interpretation with respect to the zoning bylaw or building code. This in turn will help avoid the costly delays that result from revisions to construction documents.

Early consultation with building officials also enables the architect to determine which approvals from other government bodies will be needed to obtain the building permit. As well, the authority becomes familiar with the pending application and should be able to process it more efficiently.

It is good practice for the architect to include a detailed schedule or building code analysis as part of an application for a building permit. This analysis may be part of the construction documents.

Architects are also advised to submit the building permit application — completed and

signed by or on behalf of the client — before or during the call for bids, together with the permit fee. This allows the building department to review the plans and prepare the building permit for the successful bidder before construction contract award. Such a procedure avoids potential delays and allows time to make changes to the plans before the contract is signed. Some owners require the successful contractor to obtain and pay for the building permit, which may result in delays.

The architect should develop professional relationships with building officials and deal with any conflicts in code interpretation tactfully.

Refer also to Chapter 2.3.10, *Contract Administration — Office Functions*, for Letters of Assurance in British Columbia. These documents, required at the building permit and occupancy permit stages, indicate the code-related and other responsibilities of the owners, architects, and engineers.

The Authority and the Contractor

Contact between the Authority Having Jurisdiction and the contractor or Construction Manager normally occurs after the building permit is issued. Without the building permit, the contractor cannot legally begin construction. Permit delays can be extremely costly, as workers and equipment stand idle and contractual obligations are unfulfilled.

In many cases, the contractor is responsible for:

- obtaining a permit from the municipality to occupy public property for the construction of a hoarding or covered way for public protection;
- designing the shoring for excavation or other temporary structures such as scaffolding or guards;
- obtaining separate approvals from the building departments such as a demolition permit or a sewer connection permit.

During construction, the contractor must keep the approved building permit documents on the job site so that the building official can consult them and be satisfied that construction is in general compliance with the approved documents. The contractor must not deviate from these documents without consent of the authority and the architect, and the architect must notify the authorities of any changes. To avoid problems, the architect should review any significant changes with the Authorities Having Jurisdiction, prior to preparing instructions or Change Orders for the contractor.

The contractor or Construction Manager has a responsibility as "constructor" to strictly adhere to the applicable construction safety act and regulations. Provincial legislation governs who is responsible for construction safety. In some instances and in certain jurisdictions, the owner may be the "constructor" and is therefore responsible for construction safety. The situation usually occurs when the owner is performing some of the work directly or has hired more than one contractor. Safety officials inspect construction operations frequently and have the authority to issue compliance or stop work orders in the event of infringements. Refer also to Chapter 1.2.1, *The Construction Industry*.

The architect should be aware that the architect and all employees of the architect are also subject to the construction safety act and regulations.

Approvals

The following authorities are listed in the approximate chronological order in which they may be contacted by the architect.

Planning:

- planning department — for architectural and site control, consultation, and zoning bylaw interpretation;
- committee of adjustment, or planning board, or committee of variance — for minor variances;
- planning board or committee or advisory planning commission — for initial approvals;
- municipal council — for approvals such as the development permit, re-zoning and special agreements;
- provincial municipal board — for contentious council decisions;
- design panel.

Canada Mortgage and Housing Corporation (CMHC): CMHC should be consulted early in the process for multiple-unit residential projects involving CMHC financing.

Roads and Highways:
- provincial highways authority — consult early in the design stage for approval required for projects abutting major highways outside metropolitan areas;

- provincial, county, metropolitan or regional planning and traffic authorities, and roads departments — consult early in the design stage for approval of entrances, exits, grades.

Environment, and Water Resources:
- consult regarding approval if land abuts or includes flood plains, water courses, streams, and low-lying areas or ravines;
- consult regarding approval for both land use and sewage systems for projects which have no municipal sewage available to property, for example, cottages or resort hotels;
- consult regarding environmental impact of previous or proposed use of a site;
- consult if the site has contaminated soils.

Regional Planning:
These bodies, responsible for setting official plans for larger areas, often include a group of smaller municipalities. Although local municipalities may administer site-plan approval, regional planning authority approval may also be required. To minimize confusion, the architect should determine jurisdictional responsibilities at the outset of a project.

Institutional and Other Regulating Bodies:
- hospital commissions and boards;
- housing for special needs and users;
- public health departments;
- provincial education authority;
- other authorities, for specific building types or conditions.

Deed Restrictions and Architectural Approval:
- building limitations placed by the vendor as conditions of sale;
- restrictive covenants registered on title;
- building plan approvals are sometimes instituted by industrial and residential land developers as a further means of controlling the design of buildings. Because negotiations can be very complex, the client should check "agreements to purchase" for any such restrictions, and consult the architect or the vendor;
- certain jurisdictions (such as the National Capital Commission in Ottawa) require approval of the architectural design.

Construction:
- building department — for all building permits;
- provincial authority for occupational health and safety — for commercial and industrial buildings;
- provincial fire marshal — usually for institutions receiving provincial funding and for assembly occupancies;
- municipal fire authority — usually for projects other than single-family housing.

Engineering:
- engineering departments — consult for approval of site services. Design approval may be complicated by the division of certain responsibilities to other levels of government. For example, regions may have control over the design of water services and sanitary sewers, while municipalities control storm sewers;
- municipal plumbing departments — consult for special approvals, for example, industrial waste disposal, restaurant and food preparation wastes, water and service connections, and design of special septic systems;
- works departments — for items affecting streets, easements or other public property.

Definitions

Authority Having Jurisdiction: A body having jurisdiction in certain matters of a public nature; a body having power under a statute to pass regulations to direct, specify, and govern elements or activities of construction projects such as safety, health, or standards of manufacture or installation; a government body responsible for the enforcement of any part of the building code, or the official or agency designated by that body to exercise such function (as per the NBC).

Building Code: A regulation which describes minimum requirements for public health, safety, and welfare for the design and construction of buildings.

Constructor: A person who contracts with an owner or the owner's authorized agent to undertake a project; includes an owner who contracts with more than one person for the work on a project, or undertakes the work on a project or any part thereof (as per the NBC).

Permit: A document issued by an Authority Having Jurisdiction allowing work or an activity which is specified.

Stop Work Order: An order to a constructor by an Authority Having Jurisdiction ordering the work to be stopped.

References

The American Institute of Architects (AIA). *An Architect's Guide to Building Codes & Standards*. Second Edition. Washington, D.C.: AIA Press, 1990.

Canada. National Research Council of Canada. *National Building Code of Canada*. Ottawa, Ont.

Scott, James G. *Architecture Building Codes: A Graphic Reference*.

Yatt, Barry D. *Cracking the Codes: An Architect's Guide to Building Regulations*. Toronto, Ont.: John Wiley & Sons, 1999.

Appendix — Examples of Typical Approval Process and documentation from the City of Mississauga

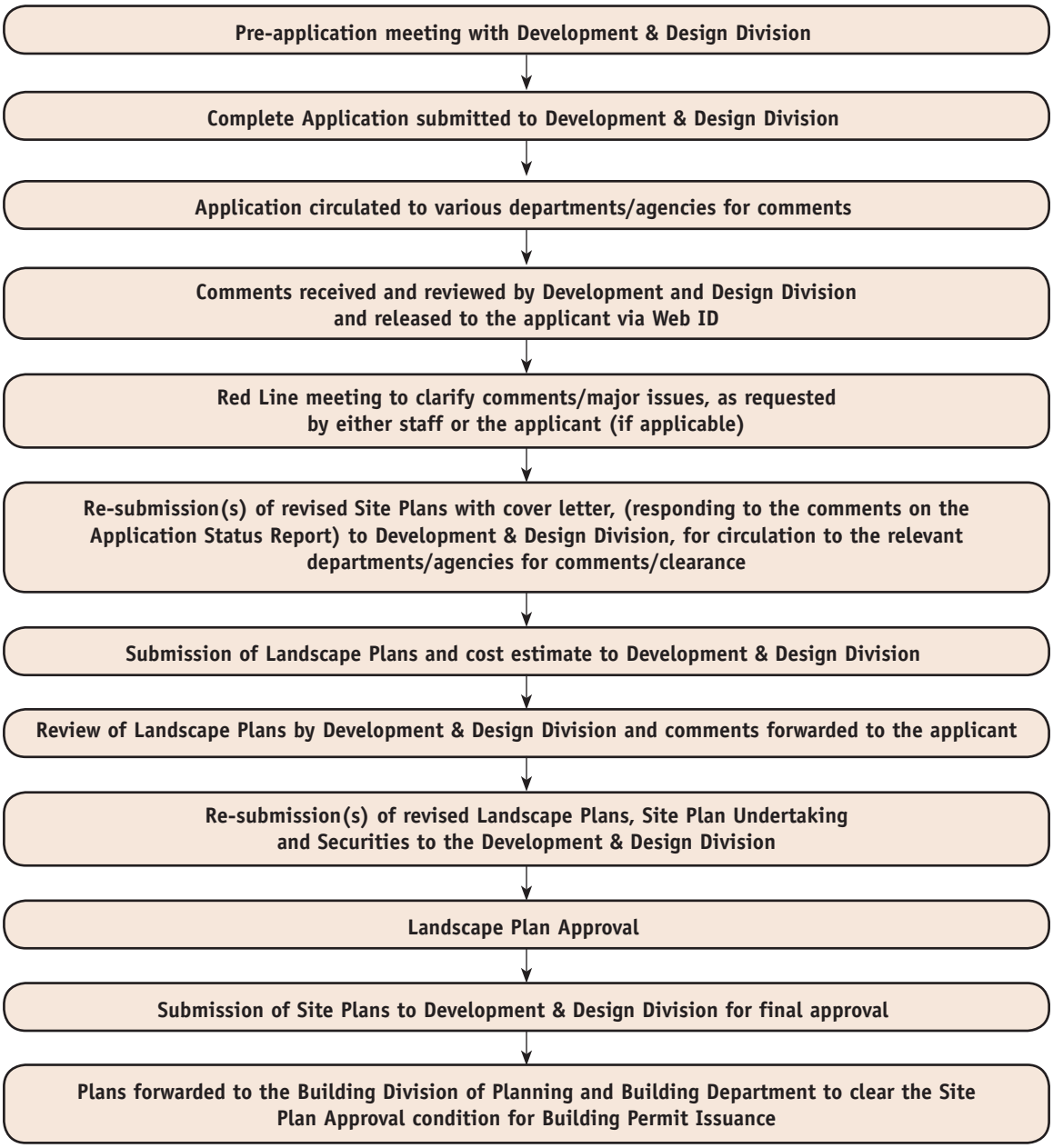
The following table contains all the various forms and documents pertaining to the site plan approval process:

Document	Description
Application for Site Plan Approval	Required for all types of site plan applications. This form includes the Environmental Site Screening Questionnaire and Declaration and the Tree Injury or Destruction Questionnaire and Declaration.
Environmental Site Screening Questionnaire and Declaration	Required for all site plan applications, and identifies the potential for environmental contamination on the subject site.
Tree Injury or Destruction Questionnaire and Declaration	Required to determine if a Tree Permit or Tree Removal Permission is required under By-law 0624-2001 where construction threatens trees that are prescribed in the By-law.
Site Plan Undertaking - Homeowners	Required for all site plan applications to ensure the applicant completes the site works as shown on the approved drawings. The undertaking must be countersigned by the Director of Development and Design.
Site Plan Undertaking - Corporations	Required for all site plan applications to ensure the applicant completes the site works as shown on the approved drawings. The undertaking must be countersigned by the Director of Development and Design.
Letter of Credit	Required when securities are held by the Development and Design Division until the site works have been completed to the satisfaction of the Division. Certified cheques or bank drafts are also acceptable forms of security.
Landscape -Reduction of Letter of Credit	Certificate of Inspection is required for all requests for site inspections,except for hoarding inspections and inspections for new dwellings, replacement housing and additions. The inspection fee must accompany the inspection request. The certificate must be embossed with the OALA seal and signed by the Landscape Architect.
Landscape -Inspection of Final Site Works	Certificate of Inspection is required for all requests for site inspections,except for hoarding inspections and inspections for new dwellings, replacement housing and additions. The inspection fee must accompany the inspection request. The certificate must be embossed with the OALA seal and signed by the Landscape Architect.
Landscape - Estimate of Total Costs	Costs for Site Works are an integral part of the Landscape Plan Approval. Landscape Architects are to submit an Estimate of Total Costs for the project, based on the information contained in the Standard Unit Costs for Site Works chart.
Landscape - Standard Unit Costs for Site Works	Costs for Site Works are an integral part of the Landscape Plan Approval. Landscape Architects are to submit an Estimate of Total Costs for the project, based on the information contained in the Standard Unit Costs for Site Works chart.
Replacement Housing, New Dwellings and Additions Guidelines	Available to assist homeowners and/or their agents to meet the design requirements for these types of site plan projects.

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The followng flow chart describes the Site Plan Approval Process

SITE PLAN PROCESS FLOW CHART
Under the Planning Act, R.S.O. 1990 c.P. 13, as amended



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Checklist: Federal Authorities Having Jurisdiction

The following is a list of the principal federal legislation and regulations.

Aeronautics Act:

The legislation authorizes the federal minister regulating transport to establish height, location, and building-use regulations in the vicinity of airports. It constitutes a zoning regulation and must be registered against the lands.

Canadian Environmental Assessment Act:

This legislation requires assessment and auditing of Crown land and federal property based on a wide range of environmental concerns.

Canada Marine Act:

This act establishes the Port Authorities which administer regulations for construction within a port. The Port Authority issues a permit for construction.

National Fire Code:

The Dominion Fire Commissioner has jurisdiction over all federal buildings constructed on any federal property in Canada, a responsibility similar to the provincial fire marshal and/or the local fire department.

Atomic Energy Control Act:

The federal government is the prime authority for ionizing radiation. Provincial officials authorized as inspectors under the Act may come from various provincial departments.

National Building Code:

The National Building Code is a model code which has no legal status unless adopted by a provincial or municipal authority. However, federal government buildings and other buildings which depend upon Canada Mortgage and Housing Corporation mortgage financing must comply with the code to qualify for financing.

Navigable Waters Protection Act:

This statute requires an approved application before any structure may be built in or over navigable waters.

National Parks Act:

This act and its subsidiary regulations govern buildings within federally owned parks.

Checklist: Provincial Authorities Having Jurisdiction

Each province has its own statutes and codes which, although titled differently, essentially govern the same matters. The following list is representative of areas regulated by legislation in most provinces. The architect should confirm the exact name and responsibility of the Authority Having Jurisdiction in the province.

Boilers and Pressure Vessels:

Although the *Boilers and Pressure Vessels Act* does not usually require permits, equipment must be inspected.

Building Construction:

In most provinces, provincial building codes have superseded all municipal building bylaws regulating construction of new buildings. Despite being provincial statutes, they are administered and enforced by the local municipality. Local building bylaws may apply to all existing buildings and to construction projects involving minor alterations to existing buildings. The provincial building codes may also include a requirement for professional design and field review of specified buildings.

Construction Safety:

Construction safety legislation governs the safety of workers during the construction, demolition or moving of buildings. The legislation stipulates the safety precautions that must be observed during construction and that may indirectly affect the contract documents.

Elevating Devices Construction:

Authorities responsible for elevators, hoists, and lifts provide for their inspection and for licences to operate them. Design and construction should be approved in advance by the appropriate provincial authority.

Environmental Protection:

Environmental authorities administer extensive regulations for the control of air pollution, toxic waste and other environmental requirements, and noise. They are administered by the appropriate provincial authority.

Fire Safety:

The provincial fire marshal and the local fire department have authority to inspect existing buildings, to order repairs and alterations, and to make regulations applicable to new buildings. Many municipalities withhold building permits for schools, hospitals, hotels, and buildings funded by the province, until plans are approved by the fire marshal. Fire safety requirements typically use the National Fire Code as a model.

Fire Safety for Hotels:

The provincial fire marshal may require that hotel plans be approved prior to construction.

Flammable Products:

Various provincial authorities administer regulations for service stations and for the storage and handling of flammable liquids and solids.

Float Homes:

In British Columbia, float homes must comply with provincial regulations.

Highway Improvement and Transportation:

The appropriate provincial authority controls/limits access to properties. Under the regulations, building permits are required to construct buildings or structures within a prescribed distance of a controlled access road. Projects within the specified distance require a municipal building permit, as well as approval from the appropriate provincial authority.

Home Owners Protection:

The provincial authority regulates residential builders and provides requirements for project warranties.

Hospitals:

The provincial hospital authorities require that all hospital plans be approved, which in turn requires approval of the provincial fire marshal. Approval by these two provincial authorities is usually required before the local municipality issues a building permit.

Liquor Licence:

The appropriate provincial authority must issue a licence, and approve the building plans, before an establishment is permitted to sell alcoholic beverages.

Public Health:

The local municipality, through a bylaw, regulates a wide range of public health concerns, including restaurants and food preparation establishments.

Theatres:

The appropriate provincial authority approves plans for all theatres before it issues a building permit.

Water Resources:

Authorities for water resources and conservation govern natural water courses and adjacent plumbing installations.

Workplace and Industrial Safety:

The appropriate provincial authority requires that plans for such buildings as industrial buildings, restaurants, office buildings, and arenas be approved prior to construction.

Checklist: Regional and Municipal Authorities Having Jurisdiction

Regional Government Authorities

In many areas, regional authorities have additional building permit requirements. Regional government authorities may require that the setback from the street line and points of ingress and egress for all buildings located on metropolitan roads be approved. In regional municipalities, the regional health unit must approve installation of septic tanks or similar sewage disposal units.

Municipal Authorities

The following is a partial list of areas regulated by municipal authorities:

Planning:
Development applications and sub-division agreements often require that the local or regional planning authority approves building and site plans before it issues a building permit.

Zoning:
Land use, bulk, height, location, and site density — which can significantly influence the architectural design of a building — are regulated by municipal authorities.

Building:
Municipal bylaws or provincial statutes containing all structural and fire safety requirements for new buildings are administered by the local municipality. Separate permits may be required for heating systems.

Plumbing:
All sanitary and plumbing installations must be in accordance with provincial regulations. The separate permit required for plumbing is usually obtained by the mechanical contractor.

Signs:
Signs and advertising devices require separate permits and must comply with applicable sign bylaws.

Swimming Pools:
Swimming pools and their protective enclosures must comply with municipal bylaws and usually require separate permits.

Public Health:
Building permits for all buildings and structures subject to public health legislation provisions are usually withheld until the plans are approved by the Public Health Authority. Included are food preparation and serving facilities and public swimming pools. Health department approval may also be required for installation of a septic tank or similar private sewage disposal system.

Public Works:
Building permits are normally withheld until the municipal public works departments are satisfied as to the availability of municipal services, and curb and sidewalk protection during construction, provision of drainage system for surface water, deposits for culverts and curb cuts, etc.

Fire Safety:
Many municipalities do not issue building permits until the local fire department has approved plans for compliance with the fire protection requirements of the building code.

Business Licences:
Local municipalities pass bylaws to license and regulate restaurants, public garages, dry-cleaning establishments, laundries, and pool halls. Each bylaw may contain regulations which affect building design or construction.

Electricity:
Electrical inspections are arranged through the local offices of the electrical authority. In addition, industrial safety officers, assistants to the fire marshal, and other inspection personnel look for electrical hazards. When a hazard is located, they may direct that corrective measures be taken to comply with the provincial electrical code, or they may request that the authority conduct a more complete inspection.

The electrical contractor may be required to submit documents to the local electrical power authority to obtain a separate electrical permit.

Municipal or Private Utilities and Services

The architect should check for the requirements of the following services:

- electricity;
- gas;
- sanitary sewer and storm drains;
- telephone;
- water;
- roads and highways;
- railways;
- cable TV.

Private Acts

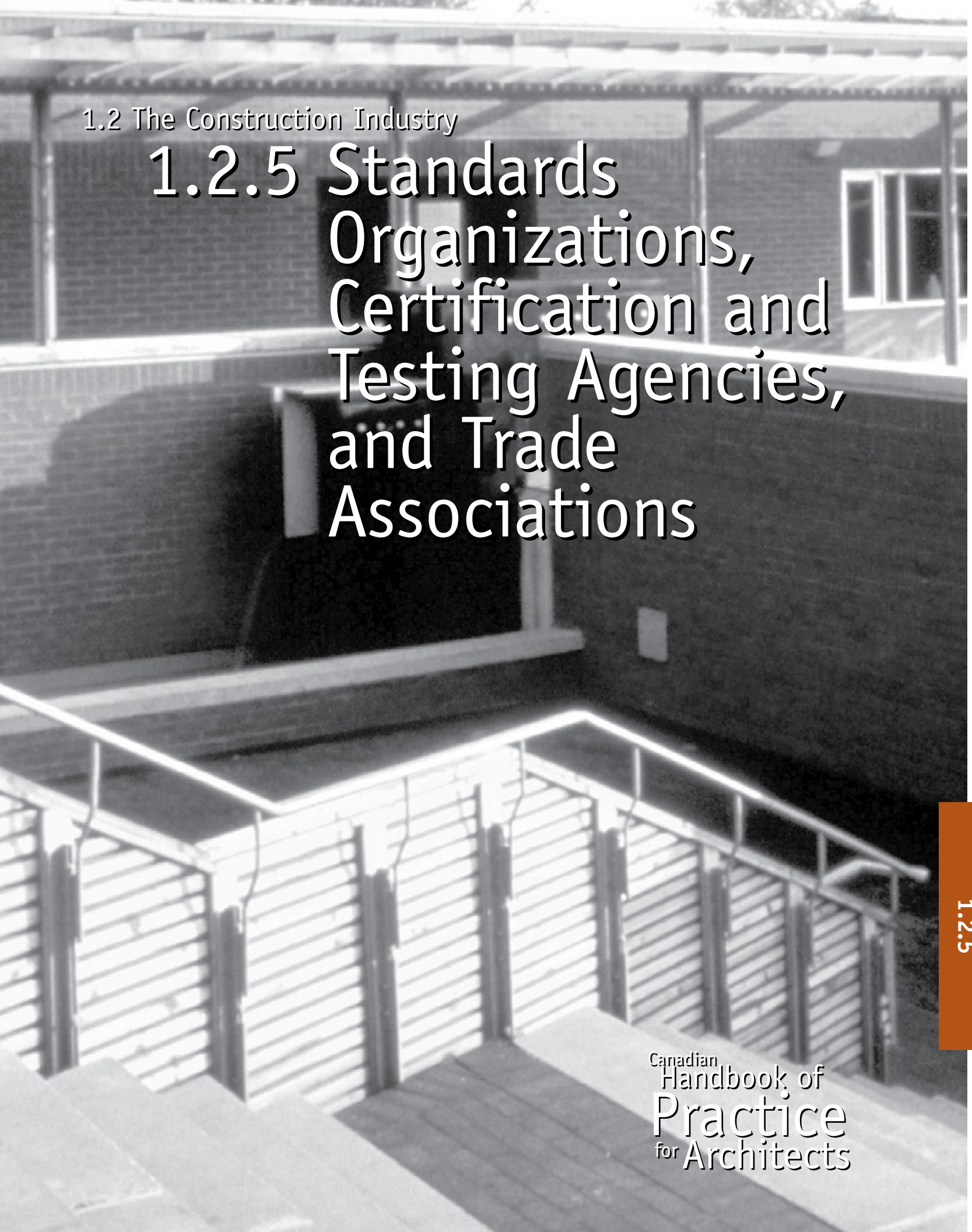
Passed by the legislature, these acts give cities, private individuals or individual municipalities specific power to govern — which may not be applicable to the province as a whole.

For example, the City of Vancouver has a separate charter and sets its own building regulations and codes independently of the rest of the province.

Deed Restrictions

These require a deed check for possible easements, rights of way, air rights for telecommunications, and other similar development constraints or restrictive covenants.

1.2.5 Standards Organizations, Certification and Testing Agencies, and Trade Associations



Introduction

Standards and Standards Organizations
- Canada Green Building Council
- International Organization for Standardization (ISO)
- Canadian Standards Organizations
- Standards Council of Canada (SCC)
- Standards and the Architect

Certification and Testing Agencies

Trade Associations

Definitions

References

List: Standards Organizations

List: Certification and Testing Agencies

List: Trade Associations

Standards Organizations, Certification and Testing Agencies, and Trade Associations

Introduction

> *Standardization — the development and application of standards — brings people together to pursue better, safer and more efficient methods and products. Standardization is an essential element of technology, innovation and trade.*
> (The Standards Council of Canada)

Like other industries and professions, the construction industry has, over time, developed accepted practices, uniform technical requirements, and agreed-upon terminologies. This has been accomplished through the adoption of **standards**.

Standards are publications prepared by experts, frequently by consensus. Once a standard has been adopted, then manufacturers, suppliers, and **testing** agencies **certify** that a product or material meets the selected standard.

Other procedures and standards are developed and promoted by **trade associations**, which are organizations comprised of members of similar construction trades or manufacturers. Examples of trade associations include the Cement Association of Canada (CAC) and the Architectural Woodwork Manufacturers Association of Canada (AWMAC).

This chapter discusses the role of standards and standards organizations, certification and testing agencies, and trade associations in the construction industry.

Standards and Standards Organizations

Because of the increase in global trade and the requirements of certain trade agreements, Canada is under pressure to "harmonize" its standards with those of its trading partners and with other international standards. Harmonizing standards is difficult because the mandates of the various standards-writing organizations differ. For example, in one nation, the mandate for the development of a certain standard may be restricted to electrical safety, whereas in another country, it may include not only electrical safety but also operator safety, energy efficiency, and other requirements. For this reason, architects must review any changes in updated standards and not assume that the scope, details or minimum level of performance of a standard will be the same as in the previous version.

Canada Green Building Council

The Canada Green Building Council (CAGBC) develops and administers a Canadian version of the popular LEED® (Leadership in Energy and Environmental Design) rating system for buildings. It is affiliated with the US Green Building Council and holds the licence for LEED® in Canada. In addition, the CAGBC certifies buildings based on documentation submitted by the architect or other members of the design and construction team. Credits are provided for the various criteria within LEED rating system and the building can achieve four possible levels of certification (certified, silver, gold and platinum).

Refer also to Chapter 1.2.1, *The Construction Industry* for more information on the Canada Green Building Council and to Chapter 2.3.4, *Pre-design* - Appendix A - *Green Building Rating Systems* for more information on LEED® .

International Organization for Standardization (ISO)

The International Organization for Standardization, or ISO, is a non-governmental federation of national standards bodies from 157 different countries. ISO is the world's largest developer and publisher of International Standards. ISO is a network of the national standards institutes of 157 countries, one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system.

ISO works with member countries to develop standards that will improve operating efficiencies and reduce trade barriers among nations. The results of this work are international agreements, published as International Standards. ISO covers standardization in all fields except electrical and electronic engineering, which is the responsibility of the International Electrotechnical Commission (IEC).

Canadian Standards Organizations

Standards in Canada are written and promoted by many different organizations, including government, industry, trade, public interest groups, and professional organizations.

Funding for the development and maintenance of standards comes from a variety of sources, including:

- industry;
- government;
- membership fees;
- the sale of standards.

Standards Council of Canada (SCC)

The Standards Council of Canada (SCC) is a federal Crown corporation with the mandate to promote efficient and effective standardization. The SCC coordinates and oversees voluntary standards development, promotion, and implementation in Canada through the National Standards System. It also coordinates Canada's participation in international standardization through the IEC and ISO.

The SCC has accredited hundreds of organizations. Some of these develop standards; others are conformity assessment bodies or certification agencies, which determine the compliance of products or services to the requirements of a standard. The list of accredited organizations includes:

- standards development organizations;
- certification agencies;
- testing and calibration laboratories;
- quality management systems (QMS) registration organizations that perform registrations to the ISO 9000 series standards;
- environmental management systems (EMS) registration organizations that perform registrations to the ISO 14000 series standards;
- certifiers and trainers who certify and train QMS and EMS auditors.

Standards and the Architect

Standards developed by non-government organizations in Canada have no force in law unless they are referenced in legislation. Many of the standards encountered by architects are referenced in:

- national building and fire codes;
- provincial building codes;
- occupational health and safety acts.

Even if a standard is not required by legislation, it cannot be ignored. Some standards carry weight in the marketplace because an industry or trade association promotes them and enforces compliance by its members. Other standards ensure that products specified by architects are of a known quality.

Architects must be familiar with current standards when preparing specifications. Refer also to Chapter 2.3.8, *Construction Documents — Specifications*.

Standards cannot be static, because they must respond to:

- changes in industrial processes;
- the introduction of new techniques or materials;
- new safety or environmental priorities.

Feedback about current standards may lead to their withdrawal or revision or to the development of new ones. A standard may be withdrawn because:

- it is no longer needed;
- no one wants to fund its maintenance any longer;
- it is cheaper to adopt a standard developed elsewhere.

Many standards are reviewed on a regular cycle such as every five years. The schedule for updating standards and for revising legislation which references standards (for example, building codes, electrical codes) may bear no relation to one another. As a result, the latest standard is not necessarily the version referenced by regulations or codes.

Refer to the "List: Standards Organizations" at the end of this chapter for various standards writing organizations.

Certification and Testing Agencies

A standard is not useful unless compliance with its requirements can be verified. Certification is the confirmation, usually by an independent organization, that a product or service meets a requirement. Certification of a product, process or system may involve:

- physical examination;
- testing;
- plant examination;
- unannounced follow-up inspections of a manufacturing site or service provider.

This procedure leads to the issuing of a formal assurance or declaration — by means of a seal, label, trademark or certificate — that the product, process or system fully conforms with the requirements of the standard. Certification indicates that a product or system has been evaluated under a formal process and that the product complies with all applicable standards.

In the past, a third party was used to certify and test for conformance to most standards. Recently, there has been a shift from third-party certification to self-certification in order to reduce the costs and the time involved in obtaining certification. Permission to self-certify is only granted after a manufacturer or service provider has implemented quality assurance procedures and submitted to examination and testing by a recognized authority.

Refer to the "List: Certification and Testing Agencies" at the end of this chapter.

Refer also to Chapter 2.1.8, *Quality Management*.

Trade Associations

The construction industry has many trade associations whose purposes include:

- promoting their industry or sector;
- developing good practices and standards for their trade or product;
- conducting research and development within the specific field of the trade associations;
- publishing and distributing information, guides, and manuals to members and others;
- lobbying government and others regarding issues specific to the trade or product.

Although trade associations vary in size and sophistication, many conduct research and prepare standards. The architect should be aware of these standards. The research on products, materials, and procedures can contribute to the design process, and many trade association standards should be referenced in project specifications.

Refer to the "List: Trade Associations" at the end of this chapter.

Definitions

Certification: The verification that a product or procedure meets a specific standard; the certification may be in the form of a certificate, seal or permission to use a trademark from an Authority Having Jurisdiction.

Standard: A publication which describes recognized or approved procedures, practices, technical requirements, and terminologies.

References

The American Institute of Architects (AIA). *An Architect's Guide to Building Codes & Standards.* Second edition. Washington, D.C.: The AIA Press, 1990.

American National Standards Institute (ANSI).
www.ansi.org

American Society for Testing and Materials (ASTM).
www.astm.org

Associations Canada. *Associations Canada: The Directory of Associations in Canada*. Published annually. Toronto, Ont.
www.circ.greyhouse.ca/page/association

Canada. National Research Council of Canada. *Registry of Product Evaluations*. Ottawa, Ont.: Institute for Research in Construction.
www.irc.nrc-cnrc.gc.ca/ccmc/regprodeval_e.html

Canadian Commission on Building and Fire Codes (CCBFC). National Research Council of Canada. *National Building Code of Canada 2005*. Ottawa, Ont.: CCBFC, 2005.
www.nationalcodes.ca/nbc/index_e.shtml

Canadian Standards Association (CSA). *Construction Plus: A Guide to CSA Construction Standards*. Third edition. Toronto, Ont.: CSA, 1993.

National Fire Protection Association (NFPA). Quincy, MA. *NFPA Codes and Standards.*
www.nfpa.org

List: Standards Organizations

International Standardization Organizations

IEC International Electrotechnical Commission
www.iec.org

The International Electrotechnical Commission (IEC) is a global organization that prepares and publishes international standards for all electrical, electronic and related technologies. These serve as a basis for national standardization and as references when drafting international tenders and contracts.

The IEC's work includes standardizing the symbols used on building construction and engineering drawings.

ISO International Organization for Standardization
www.iso.org

Refer also to the section on ISO in this chapter.

Canadian Standardization and Standards-writing Organizations

SCC Standards Council of Canada
www.scc.ca

Refer to the section on the SCC in this chapter.

CNSC Canadian Nuclear Safety Commission
www.cnsc.gc.ca/eng

The Canadian Nuclear Safety Commission (CNSC) protects the health, safety and security of Canadians as well as the environment, and respects Canada's international commitments on the peaceful use of nuclear energy.

CCBFC Canadian Commission on Building and Fire Codes
www.nationalcodes.ca/ccbfc

Under the auspices of the National Research Council, the CCBFC produces the National Building Code (NBC), the National Fire Code (NFC), the Canadian Plumbing Code (CPC), the Canadian Farm Building Code (CFBC), and the Canadian Housing Code (CHC).

CGA Canadian Gas Association
www.cga.ca

CGSB Canadian General Standards Board
www.tpsgc-pwgsc.gc.ca/cgsb/home/index-e.html

The CGSB, a part of Public Works and Government Services Canada, is mandated to provide standardization and conformity assessment services in support of government purchasing and other requirements. The CGSB is the only accredited federal government standards-development body in Canada.

The CGSB's services include:

- maintenance of approximately 1000 standards, specifications, manuals, and guides in both English and French;
- listings of pre-qualified products and services;
- ISO 9001 conformity assessment services;
- accredited ISO 9001 quality system registration services;
- accredited ISO 14001 environmental management systems services.

CSA Canadian Standards Association
www.csa.ca

The Canadian Standards Association is a not-for-profit membership-based association serving business, industry, government and consumers in Canada and the global marketplace.

The CSA develops standards in the following areas of interest to architects:

- **Business/Management Systems**
- **Communications/Information**
- **Construction:** Building Materials and Products; Concrete; Masonry; Forest Products; Plumbing Products and Materials; Industrialized Building Construction; Structures (Design)
- **Electrical and Electronics:** Canadian Electrical Code Part I; Canadian Electrical Code Part II, Wiring Products, Industrial Products, Consumer and Commercial Products; Canadian Electrical Code Part III, Electrical Engineering Standards, Performance of Electrical Products
- **Energy:** Renewable Energy; Energy Conservation in Housing; Fire Safety and Fuel Burning Equipment
- **Environment:** Environmental Technology; Environmental Management Systems
- **Gas Equipment:** Food Processing and Food Refrigeration; Gas-Fired Domestic and Commercial Heating Equipment and Air Conditioning; Large Input Commercial and Industrial Equipment; Domestic and Commercial Water Heaters and Boilers; Incineration and Accessories; Laundry Equipment; Manual Valves, Hose, Couplings, and Assemblies
- **Life Sciences:** Health Care Technology; Public Safety; Occupational Health and Safety
- **Materials Technology:** Welding, Metals, and Metal Products
- **Transportation/Distribution:** Materials Handling and Logistics; Oil and Gas Systems and Materials.

ULC Underwriters' Laboratories of Canada
www.ulc.ca

The ULC develops standards in the following areas of interest to architects:

- Automotive Equipment
- Building Construction Materials
- Burglar Alarm Equipment and Systems
- Factory-Built Fireplaces, Chimneys, and Vents
- Fire Alarm Equipment and Systems
- Fire Extinguishers, Extinguishing Systems, and Fire Extinguishing Media
- Fire Fighting Apparatus and Equipment
- Fire Protection Equipment
- Fittings and Associated Equipment for Flammable Fuels
- Fittings and Associated Equipment for Gases
- Kitchen Exhaust Equipment
- Physical Security Equipment
- Tanks and Associated Equipment
- Thermal Insulation

WHMIS Workplace Hazardous Materials Information System (Health Canada)
www.hc-sc.gc.ca/ewh-semt/occup-travail/whmis-simdut/index-eng.php

The Workplace Hazardous Materials Information System (WHMIS) is Canada's national hazard communication standard. The key elements of the system are cautionary labelling of containers of WHMIS "controlled products", the provision of material safety data sheets (MSDSs) and worker education and training programs.

North American Standardization and Standards-writing Organizations

ANSI American National Standards Institute
www.ansi.org

ANSI — a private, not-for-profit membership organization — is the administrator and coordinator of the U.S. private-sector voluntary standardization system. ANSI does not itself develop American National Standards (ANSs). ANSI has accredited more than 175 distinct entities to develop standards.

ASHRAE American Society of Heating, Refrigerating, and Air Conditioning Engineers
www.ashrae.org

ASHRAE's purpose is to advance the arts and sciences of heating, ventilation, air conditioning,and refrigeration through research, standards writing, continuing education, and publications. ASHRAE writes standards that set uniform methods of testing and rating equipment andestablish accepted practices for the industry worldwide, such as the design of energy-efficientbuildings. ASHRAE's research program investigates numerous issues, such as identifying new refrigerants that are environmentally safe.

ASME American Society of Mechanical Engineers, Inc.
www.asme.org

ASME International maintains and distributes codes and standards for the design, manufacturing, and installation of mechanical devices. The standards are used in more than 90 countries throughout the world. ASME also publishes technical journals, books, and reports on mechanical engineering.

ASTM American Society for Testing and Materials
www.astm.org

Organized in 1898, the ASTM is a not-for-profit organization that publishes standard test methods, specifications, practices, guides, classifications, and terminology. The ASTM's standards development activities encompass metals, paints, plastics, textiles, petroleum, construction, energy, the environment, and many other areas. The ASTM has developed more than 10,000 technical standards, which are published each year in the 72 volumes of the *Annual Book of ASTM Standards*.

AWPA American Wire Producers Association
www.awpa.org

The AWPA is an international trade association for the ferrous wire and wire products industry in North America.

EPA Environmental Protection Agency
www.epa.gov

The EPA is a U.S. government agency mandated to protect human health and to safeguard the natural environment.

NFPA National Fire Protection Agency
www.nfpa.org

The NFPA's technical committees develop more than 300 codes and standards known collectively as the *National Fire Codes*. NFPA codes and standards are available as the 12-volume *National Fire Codes*, as more than 300 individual documents, or on disk.

NFPA periodicals supplement the *Fire Protection Handbook* with current information. *Fire Technology* provides reports on current research in the technical aspects of fire protection. The NFPA established the not-for-profit National Fire Protection Research Foundation to research fire risk assessment as well as new technologies and strategies.

Commonly used NFPA codes and standards include the following:

- National Electrical Code (NFPA 70);
- Life Safety Code (NFPA 101);
- Flammable and Combustible Liquids Code (NFPA 30);
- Standard for the Installation of Sprinkler Systems (NFPA 13);
- Standard for the Storage and Handling of Liquefied Petroleum Gases (NFPA 58);
- Standard for Health Care Facilities (NFPA 99).

NIST National Institute of Standards and Technology
www.nist.gov

NIST is an agency of the U.S. Department of Commerce's Technology Administration and was established to advance measurement science and develop standards.

SMACNA Sheet Metal and Air Conditioning Contractors' National Association
www.smacna.org

SMACNA is an international association of union contractors with chapters throughout the United States, Canada, Australia, Japan, and Brazil. SMACNA develops technical standards and manuals for all facets of the sheet metal industry, including duct construction and installation, air pollution control, energy recovery, and roofing. SMACNA's Technical Resources Department answers technical questions from architects and others.

UL Underwriters Laboratories
www.ul.com

Underwriters Laboratories Inc. (UL) is an independent product safety certification organization that has been testing products and writing Standards for Safety for over a century. UL evaluates products, components, materials and systems.UL's worldwide family of companies and network of service providers includes 62 laboratory, testing and certification facilities serving customers in 99 countries.

List: Certification and Testing Agencies

This is a partial list of various certification and testing agencies in Canada. Some of these organizations also prepare standards.

BNQ	Bureau de normalisation du Québec
CLAS	Calibration Laboratory Assessment Service/NRC
CAEAL	Canadian Association for Environmental Analytical Laboratories Inc.
CAGBC	Canada Green Building Council
CGA	Canadian Gas Association
CLSAB	Canadian Lumber Standards Accreditation Board
CSA	Canadian Standards Association
CWB	Canadian Welding Bureau
COFI	Council of Forest Industries
ITS	Intertek Testing Services
KPMG	KPMG Quality Registrar Inc.
NLGA	National Lumber Grades Authority
QMI	Quality Management Institute, a division of CSA
QUASAR	Quality Systems Assessment Registrar
SGS	SGS International Certification Services Canada Inc.
ULC	Underwriters' Laboratories of Canada
UL	Underwriters Laboratories (U.S.)
WHPS	Warnock Hersey Professional Services

List: Trade Associations

This is a partial list of trade associations organized by the MasterFormat™ divisions with a link to the website. The list includes Canadian and U.S. references. The contact information can also be found through a search on the Internet or in the following sources:

- **National Master Specification (NMS)**
- **Associations Canada — *The Directory of Associations in Canada*.**

Division 3

ACI	American Concrete Institute *www.concrete.org*
ACPA	American Concrete Pavement Association *www.pavement.com*
ACPA	American Concrete Pipe Association *www.concrete-pipe.org*
CAC	Cement Association of Canada *www.cement.ca*
CPCI	Canadian Precast Prestressed Concrete Association *www.cpci.ca*
CRSI	Concrete Reinforcing Steel Institute *www.crsi.org*
NPCA	National Precast Concrete Association *www.precast.org*
PCI	Precast/Prestressed Concrete Institute *www.pci.org*

Division 4

BIA	Brick Industry Association *www.bia.org*
BSI	Building Stone Institute *www.buildingstoneinstitute.org*
CMCA	Canadian Masonry Contractors Association *www.canadamasonrycentre.com*
CBAC	Clay Brick Association of Canada *www.claybrick.ca*
NCMA	National Concrete Masonry Association *www.ncma.org*

Division 5

AA	Aluminum Association *www.aluminum.org*
AWS	American Welding Society *www.aws.org*
AWPA	American Wire Producer's Association *www.awpa.org*
CCBDA	Canadian Copper and Brass Development Association *www.ccbda.org*
CISC	Canadian Institute of Steel Construction *www.cisc-icca.ca*
CSSBI	Canadian Sheet Steel Building Institute *www.cssbi.ca*
NAAMM	National Association of Architectural Metal Manufacturers *www.naamm.org*

Division 6

AHA	American Hardboard Association *www.domensino.com/AHA/*
AITC	American Institute of Timber Construction *www.aitc-glulam.org*
AWI	Architectural Woodworking Institute *www.awinet.org*
AWPA	American Wood-Preservers Association *www.awpa.com*
AWMAC	Architectural Woodwork Manufacturers Association of Canada *www.awmac.com*
CLA	Canadian Lumbermen's Association *www.canadianlumbermen.com*
CPIA	Canadian Plastics Industry Association *www.cpia.ca*
CWC	Canadian Wood Council *www.cwc.ca*
FPS	Forest Product Society *www.forestprod.org*
NHLA	National Hardwood Lumber Association *www.natlhardwood.org*
TPIC	Truss Plate Institute of Canada *www.tpic.ca*

Division 7

AI Asbestos Institute
www.asbestos-institute.ca
CRCA Canadian Roofing Contractors' Association
www.roofingcanada.com
EIMA EIFS Industry Manufacturer's Association
www.eima.com
TIAC Thermal Insulation Association of Canada
www.tiac.ca

Division 8

AAMA American Architectural Manufacturers Association
www.aamanet.org
AGMCA Architectural Glass and Metal Contractors Association
www.agmca.ca
CSDFMA Canadian Steel Door and Frame Manufacturing Association
www.csdma.org
CWDMA Canadian Window and Door Manufacturers Association
www.cwdma.ca
GANA Glass Association of North America
www.glasswebsite.com
NGA National Glass Association
www.glass.org
WDMA Windows & Door Manufacturers Association
www.wdma.com

Division 9

AWCI Association of Wall and Ceiling Industries International
www.awci.org
CCI Canadian Carpet Institute
www.canadiancarpet.org
CPCA Canadian Paint and Coatings Association
www.cdnpaint.org
TCAA Tile Contractors Association of America
www.tcaainc.org
NFCA National Floor Covering Association
www.nfcaonline.ca
TTMAC Terrazzo, Tile and Marble Association of Canada
www.ttmac.com
WACCA Walls and Ceilings Contractors Association
www.wacca.ca

Division 23

AHRI Air Conditioning Heating and Refrigeration Institute
www.ahrinet.org
AMCA Air Movement and Control Association Inc.
www.amca.org
API American Petroleum Institute
www.api.org
CGA Canadian Gas Association
www.cga.ca
HRAI Heating, Refrigerating and Air Conditioning Institute of Canada
www.hrai.ca
MCAC Mechanical Contractors Association of Canada
www.mcac.ca
MSS Manufacturers' Standardization Society of Valve and Fittings Industry
www.unitedvalve.com
SMACNA Sheet Metal and Air Conditioning Contractors National Association
www.smacna.org

Division 26

CECA Canadian Electrical Contractors Association
www.ceca.org
EEMAC Electrical Equipment Manufacturers Association of Canada
EFC Electro-Federation Canada
www.electrofed.com
IEEE Institute of Electrical and Electronics Engineers
www.ieee.ca
NEMA National Electrical Manufacturers Association
www.nema.org

Division 28

CASA Canadian Alarm and Security Association
www.canasa.org

Division 32

ASPT Association of Asphalt Paving Technologists
www.asphalttechnology.org

Division 33

AWWA American Water Works Association
www.awwa.org

Canadian Handbook of Practice for Architects

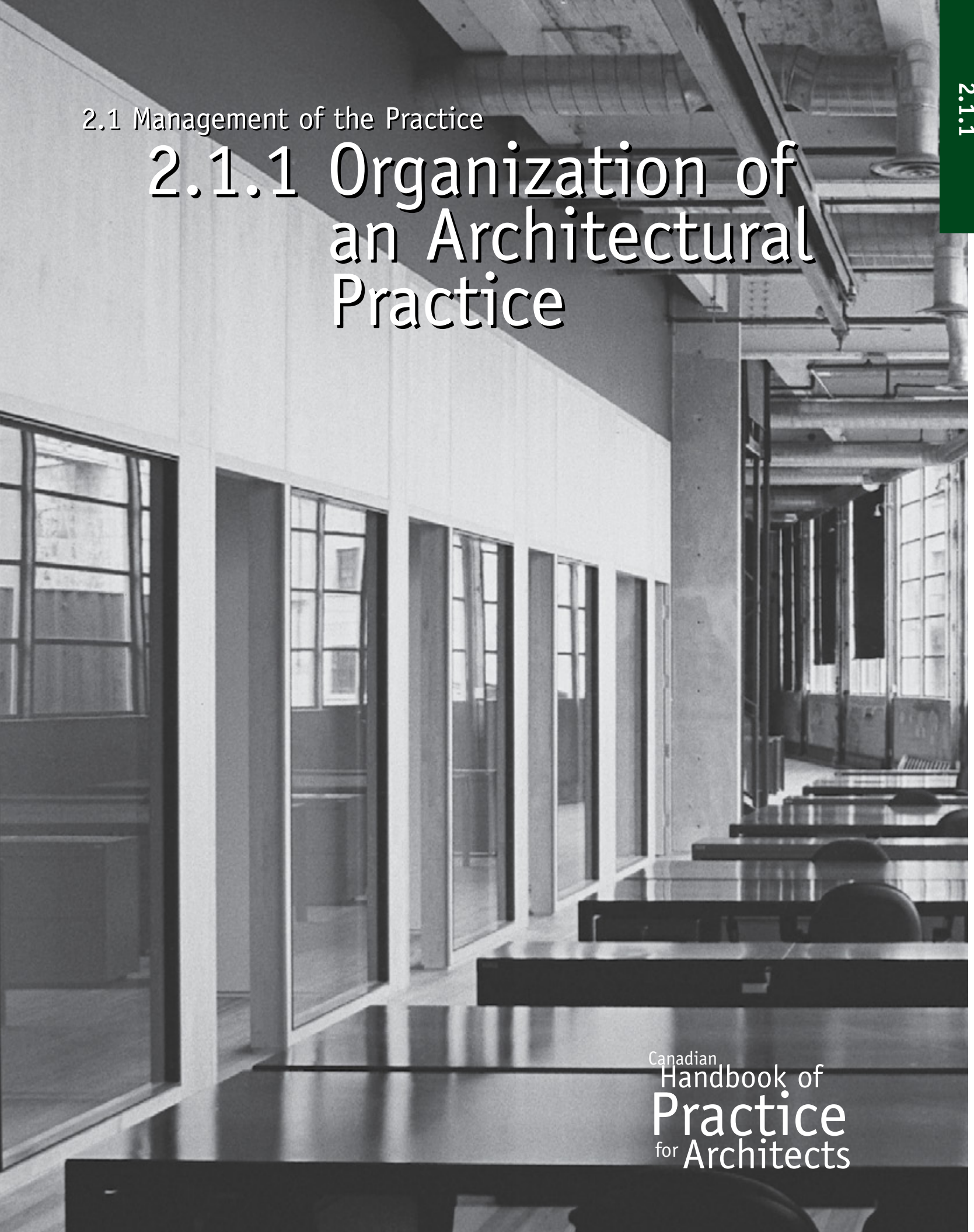


Volume 2

Management

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2.2 Sample Forms for the Management of the Practice
2.3 Management of the Project
2.4 Sample Forms for the Management of the Project

2.1.1 Organization of an Architectural Practice



Canadian Handbook of Practice for Architects

2.1.1

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- Client Base

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Organization of an Architectural Practice

Introduction

Architects decide to set up their own practices for many different reasons. Some of these include:

- the desire to control one's own professional destiny;
- the motivation to provide service to society and to clients;
- the wish to specialize in a certain field of architecture or market niche;
- an offer to form a partnership or purchase shares from an established firm or colleague;
- the award of a significant commission, either through a competition or from a business associate;
- a means for creating work or employment.

Anyone considering such a change should be aware from the outset that establishing an architectural practice has serious implications for one's personal, professional, and business life. The individual should carefully weigh all the implications before embarking on this course.

Establishing and maintaining an architectural practice demands certain skills. One must be able to:

- market one's services and get work;
- negotiate terms and compensation in client-architect agreements;
- hire and manage qualified staff;
- perform the full range of architectural services efficiently and effectively;
- work with the construction industry and administer contracts;
- operate profitably and provide stability to the practice.

The first key steps in launching a practice are to assess one's own abilities, set long-term goals, and develop a strategic plan.

Strategic Planning

A strategic plan is a document that charts a course for the development of an architectural practice in clear, simple terms. It should identify the following:

- the architectural practice's unique offerings in the marketplace;
- a vision for the future of the practice;
- measurable goals or milestones.

Typically, a strategic plan would encompass a time frame of three to ten years and it should be updated continually. The plan should address the following issues:

- the *goals* of the architectural practice;
- a *service* plan for providing architectural services to clients;
- a *financial* plan;
- a *human resources* plan for staff and principals;
- a public relations and *marketing* plan;
- a *succession* plan.

These various topics are discussed elsewhere in this section 2.1, *Management of the Practice*. Strategic plans usually assess:

- strengths;
- weaknesses;
- opportunities;
- threats.

Styles of Architectural Practices

Many organizations develop a mission statement which helps to ensure that all members of the organization focus on the goals established in the strategic plan.

The mission statement should define the style of practice, to a certain extent. Three common generic styles as described by The Coxe Group are:

- *Strong-idea (brains) firms*, which are organized to deliver singular expertise or innovation on unique projects. The project technology of strong-idea firms flexibly accommodates the nature of any assignment, and often depends on one or a few outstanding experts or "stars" to provide the last word;
- *Strong-service (gray-hair) firms*, which are organized to deliver experience and reliability, especially on complex assignments. Their project technology is frequently designed to provide comprehensive services to clients who want to be closely involved in the process;
- *Strong-delivery (procedure) firms*, which are organized to provide highly efficient service on similar or more-routine assignments, often to clients who seek more of a product than a service. The project technology of a delivery firm is designed to repeat previous solutions over and over again with highly reliable technical, cost and schedule compliance."

  -excerpt from the book, *Success Strategies for Design Professionals*, by The Coxe Group, Inc.

Client Base

An architect can attract clients and expand the practice's client base in a number of ways, including:

- specializing in a field of expertise or in a particular building type;
- developing new markets;
- providing pre-design or post-construction services to encompass the life of a facility;
- forming partnerships with non-traditional groups or individuals who are not normally aligned with architects;
- expanding the geographic base of the practice.

Refer to Chapter 2.1.3, *Public Relations and Marketing*, for information on marketing architectural services.

Types of Ownership of an Architectural Practice

Architectural practices are structured according to size and complexity. Frequently a practice will start as a simple entity, such as a sole proprietorship, and evolve into a more complex legal structure, such as a corporation, or partnership of corporations. Several factors affect the type of ownership including relationships with professional colleagues, tax implications, and exposure of personal assets. Architects should seek the advice of a lawyer and accountant before structuring a practice.

Agreements

All business relationships should be based on a written agreement. Business partners should share certain values and financial goals, and architects are no exception. For partners or shareholders, a well-structured agreement provides a vehicle to deal with expansion, difficulties, and disagreements, as well as with disasters. Obtaining professional advice from a lawyer and accountant in preparing an agreement which outlines the ownership of an architectural practice is essential.

The structure of the practice must comply with the various architects acts and regulations of the provincial or territorial associations of architects as well as with other business regulations.

Refer to the "Charts: Comparison of Practice Requirements of Each Provincial Association" in Chapter 1.1.5, *The Organization of the Profession in Canada*.

Sole Proprietorships

A sole proprietor is a single, unincorporated owner of an architectural practice. This architect has full personal control over all aspects of the practice. A sole proprietor can range from someone with a small, home-based office practice to an architect who employs many professionals and para-professionals. Most architectural practices in Canada are sole proprietorships.

Partnerships

A partnership is comprised of two or more partners. Most provincial associations impose restrictions on whom an architect may form a partnership with.

Refer to the "Comparison of Provincial Requirements regarding Partnerships" in Chapter 1.1.5, *The Organization of the Profession in Canada*.

A partnership may include "associates"; however, only the partners bear personal responsibility for the control and liabilities of the practice. Each partner is both jointly and severally liable for the partnership's full obligations. Because a partnership is a complex form of ownership, its terms should be spelled out in a partnership agreement. For items to include in a partnership agreement, refer to "Checklist: Issues to Consider for Partnership Agreements Between Architects" at the end of this chapter.

Corporations

A corporation is a legal, collective entity authorized by statute to act as an individual business unit. Most provincial and territorial associations of architects have regulations which restrict the share ownership and the qualifications of directors of architectural corporations.

In Québec, the Ordre des architectes du Québec (OAQ) is in the process of changing its regulations to permit architects to incorporate. As of 2008, a company cannot practise architecture; only individuals, partnerships or consortia can practise architecture. However, an architect may provide professional services through a company in which he or she is a majority shareholder. Furthermore, an architect cannot practise in any type of arrangement with non-architects such as engineers, urban planners, interior designers. However, these other individuals may be minority shareholders in a company of which one or more architects are majority shareholders.

Refer to the "Comparison of Provincial Requirements regarding the Ownership and Structure of Corporations Which Practise Architecture" in Chapter 1.1.5, *The Organization of the Profession in Canada*.

Incorporating a practice is done for a variety of reasons. The issues should be reviewed with a lawyer and an accountant before forming a corporation and entering into a shareholders' agreement. For items to include in a shareholders' agreement, refer to "Checklist: Issues to Consider for a Shareholders' Agreement for Architectural Corporations" at the end of this chapter.

Partnership of Corporations

A partnership of corporations is an architectural practice structured to preserve the individual identity of two or more corporations. There are a variety of reasons for creating this form of business entity. Such an entity:

- enables individual architects who are incorporated for business or tax reasons to practise with both the advantages of a partnership and the advantages of their corporation;
- allows two or more corporate practices to retain separate identities for certain types of projects but join forces for other types of projects;
- allows the bringing together of complementary but differing interests and ownership -- for example, one corporation may focus on architectural services, while the other is a corporation providing support through drafting services, equipment, real estate and other chattels, etc.

Joint Ventures

Joint ventures are usually formed to create one architectural entity for the purpose of a single specific project. Frequently, a joint venture is set up to provide complementary services for a particular project -- for example, a practice specializing in hospital work may need to team up with a firm located near the site of the project to provide contract administration services, especially field review.

Joint venture projects may require special liability insurance, often on a single project basis, to protect the parties forming the joint venture. Architects contemplating working in

association or in a joint venture should review the circumstances with their professional liability insurers to determine the most appropriate insurance arrangements. Clients may require the participants of a joint venture to obtain single project insurance with higher limits than the practices carry through their annual practice insurance.

Architectural practices should clearly define -- in writing -- their share of the services and fees before entering into a joint venture. Some provincial associations regulate joint ventures and their names.

For items to include in a joint venture agreement, refer to "Checklist: Issues to Consider when Preparing a Joint Venture Agreement" at the end of this chapter.

Multi-Disciplinary Firms

Multi-disciplinary firms are professional companies which include architects and other professionals, usually engineers. Such firms may also include urban planners, landscape architects, interior designers, and other consultants. Any multi-disciplinary firm must comply with the requirements of the provincial associations of architects in order to practise architecture. It can sometimes be beneficial to have all disciplines on a building project readily available in-house. Such an arrangement can simplify communication among, and coordination of, the various disciplines.

Foreign Firms

Certain foreign architectural firms have established branch offices in Canada. The structure of the foreign firm and its ownership must nevertheless comply with the requirements of the provincial association of architects. Several Canadian firms have established branch offices overseas to better serve foreign clients.

Internal Structure of an Architectural Practice

Once a firm is established and grows, it requires an internal structure or mechanism for delivering architectural services. The structure of the practice depends on its leadership and its values and culture, and on the needs of the project.

There are several models:

- design teams or in-house studios
- departments;
- any combination of the above.

Some architectural practices sub-divide the office into teams to deal with a project in its entirety; others compartmentalize the firm, permitting each department to specialize in one type or stage of architectural services.

Design Team or In-house Studio

A design team is usually assembled for a specific project, drawing on the skills of personnel in the office. The team leader, typically a project architect, coordinates and manages the team and deals with the client, sometimes together with the "principal in charge." Occasionally, some architectural practices establish studios which remain together as efficient working teams for an indefinite period of time.

Departments, or Departments with Project Managers

Some larger architectural practices sub-divide staff into groups or departments. Usually each department is responsible for a different phase of the project, such as:

- marketing;
- design and design development;
- construction documents;
- contract administration.

A project architect or senior employee (often called a project manager) is responsible for ensuring proper coordination when the project passes from one department to the next.

Other Combinations

It is possible to create various combinations of design teams, permanent studios and departments.

Other Professional Services

Several professional services are required to support an architectural practice. These include:

- legal;
- accounting and tax planning;
- insurance.

Legal

Establishing a professional relationship with a lawyer is important for the architect. Legal services may be required for the following:

- establishing a partnership or corporation;
- preparing annual minutes for the corporation;
- entering a lease or purchasing office property;
- preparing certain employment agreements with staff;
- reviewing professional liability insurance options and claims;
- reviewing non-standard client-architect agreements or amendments to standard agreements;
- reviewing non-standard owner-contractor agreements or amendments to standard agreements (on behalf of the client);
- assisting in the collection of accounts which are in dispute;
- handling other disputes or legal issues (such as filing and processing liens and mortgages; human resources problems).

It may be necessary to establish a relationship with a number of different lawyers who have expertise in specific fields of practice; or, alternatively, with a larger firm of lawyers that has a range of in-house expertise.

Accounting and Tax Planning

It is also important to establish a relationship with an accountant. Accounting services may be required for the following:

- establishing a practice, whether a sole proprietorship, partnership or corporation;
- establishing financial terms of a partnership or shareholders' agreement;
- preparing periodic balance sheets and profit/loss positions;
- preparing annual financial statements;
- preparing personal and corporate income tax returns;
- assisting in the preparation of sales and value-added tax returns;
- assisting a lawyer in the preparation of a corporation's annual minutes;
- analyzing the financial position of the practice;
- providing tax planning advice.

Some larger architectural practices employ a comptroller, usually an accounting professional, who directs and monitors the day-to-day financial operations of the practice. It may still be required to engage an accountant to provide tax planning advice and ongoing advice on the financial position of the firm, as well as annual financial statements and, if required, audited statements.

Refer also to Chapter 2.1.4, *Financial Management,* for other issues to discuss with an accountant and for an overview of the financial operations of an architectural practice.

Insurance

An architectural practice will have a variety of insurance requirements. Some of these include:

- Professional Liability Insurance
  - general coverage
  - special project coverage
  - add-on insurance or "excess" coverage
- Office Premises and Automobiles
  - theft and vandalism
  - accident
  - fire and other damage
  - owned and leased vehicles
- Life and Accident Insurance
  - personal
  - business partners and directors
- Disability Insurance, to cover
  - office overhead
  - loss of business
  - personal income (income protection)
- Medical and Dental
  - extended medical care
  - dental plan
  - vision care
- Workers Compensation(regulated provincially)

To ensure that the practice is properly and adequately covered, consult an experienced insurance agent or an independent risk management advisor.

A few provincial associations of architects have established liaisons with certain insurance underwriters who provide discounted premiums to architects. Professional liability insurance is a specialized type of insurance provided by a limited number of insurance underwriters and also by the Ontario Association of Architects

Plan for Certificate of Practice Holders of the OAA by the Pro Demnity Insurance Company and by the Fonds d'assurance de la responsabilité professionnelle de l'Ordre des architectes du Québec for members of the OAQ.

Refer also to Chapter 1.1.5, *The Organization of the Profession in Canada*, Chart 5B: A Comparison of Provincial and Territorial Requirements regarding Professional Liability Insurance.

Investment and Retirement Planning

Although not unique to the profession, all architects should plan for retirement and therefore seek the advice of a financial investment professional to ensure proper planning for retirement.

Refer also to Chapter 2.1.2, *Succession Planning*, for other considerations related to retirement planning.

Definitions

Corporation: A legal collective entity which acts as an individual business unit requiring a legal instrument to create the entity as a commercial corporation.

Joint Venture: A defined business relationship between two or more architectural practices for a limited purpose or objective, without some of the inherent duties and responsibilities of a partnership.

Partnership: An unincorporated relationship between architects (or other professionals as may be permitted by provincial requirements) for carrying on business in common.

Sole Proprietorship: An architectural practice owned and controlled exclusively by one person.

References

Cramer, James P. *Design + Enterprise: Seeking a new reality in architecture*. Washington, D.C.: The American Institute of Architects Press, 1994.

Cuff, Dana. "Professions and Professional Life." *The Architect's Handbook of Professional Practice*. Washington, D.C.: The American Institute of Architects Press, 1994.

Coxe, Weld, Nina F. Hartung, Hugh Hochberg, Brian J. Lewis, David H. Maister, Robert F. Mattox, Peter A. Piven. *Success Strategies for Design Professionals*. The Coxe Group Inc.,1987

Demkin, Joseph A., executive editor. *The Architect's Handbook of Professional Practice*. The American Institute of Architects. Hoboken, New Jersey: John Wiley & Sons, Inc. 2008.

Kogan, Raymond F., AIA. *Strategic Planning for Design Firms*. United States, 2007

Maister, David H. "*Managing the Professional Service Firm*." New York, New York: Free Press Paperbacks, 1997.

Stasiowski, Frank A. *Strategic Planning: Preparing Your Firm for Success in the Future*. Newton, MA: PSMJ Resources, Inc., 1997.

McGill Business Consulting Group: *Succeeding by Design - A Perspective on Strengthening the Profession of Architecture in Ontario and Canada*, 2003.
www.raic.org/resources_archives/research/succeedingbydesign_e.pdf

Checklist: Issues to Consider for Partnership Agreements

Establishment of the Partnership

- ❑ Identification of Partners
- ❑ Partnership Name and Trademark or Logo
- ❑ Registration of Partnership under Partnerships Registration Acts
- ❑ Right to Use Former Partner's Name(s)
- ❑ Place of Business
- ❑ Description of Architectural Practice

Term and Termination

- ❑ Commencement Date
- ❑ Termination or Dissolution
- ❑ Liquidation or Distribution of Assets
- ❑ Ownership of Clients

Disposition of Partnership Interests

- ❑ Admission of New Partners
- ❑ Retirement, Bankruptcy, Prolonged Illness or Death of Partner
- ❑ Sale of Partnership Interest To Third Party
- ❑ Valuation of Partnership Interest
- ❑ Prohibition of Assignment or Encumbrance of Partnership Interest
- ❑ Expulsion of Partner
- ❑ Grounds for Dissolution of Partnership
- ❑ Purchase Options: On Death, Retirement or Expulsion, or By Successors from Continuing Founders
- ❑ Power Of Attorney
- ❑ Indemnification for Retired Partners or Deceased Estate when Name Used

Accounting

- ❑ Accounting Principles
- ❑ Auditor
- ❑ Fiscal Year and Budget
- ❑ Banking Arrangements
- ❑ Partnership Assets and Personal Assets

Restriction on Partners

- ❑ Restrictions on Use of Partnership Name
- ❑ Liability for Personal Obligations
- ❑ Indemnities of Partners for Prohibited Acts
- ❑ Payments of Separate Debts
- ❑ Devotion of Full Time and Attention to Business
- ❑ Non-Competition
- ❑ Requirements of Partners to enter into Marriage Contracts with Spouses
- ❑ Insurance
- ❑ Maintenance of Good Standing and Architectural Licence

Management of the Partnership

- ❑ Partners' Authorities
- ❑ Appointment of Managing Partner
- ❑ Management Committee
- ❑ Contracting with Third Parties
- ❑ Division of Responsibilities

Capital and Income

- ❑ Contribution of Capital
- ❑ Division of Net Profits
- ❑ Drawing on Partnership Funds
- ❑ Limitation of One Partner's Share in Profits and Losses
- ❑ Inclusion of Salaries and Benefits in Determining Partners' Profits
- ❑ Liability to Account for Outside Income
- ❑ Remuneration for Outside Income

General

- ❑ Mediation and Arbitration
- ❑ Ownership of Copyright and Waiver of Moral Rights
- ❑ Confidentiality and Trade Secrets
- ❑ Further Assurances
- ❑ Loss of Professional Membership of Any Partner
- ❑ Volunteerism

The foregoing is a list of common concerns and clauses in partnerships and partnership agreements. The list is not exhaustive, will vary in individual circumstances, and cannot replace legal advice. Architects should consult their lawyer(s) before negotiating and entering into a partnership or a partnership agreement.

Checklist: Issues to Consider for a Shareholders' Agreement for Architectural Corporations

Construction of the Agreement

Parties to the Agreement

- ❑ Parties Who Are Not Non-residents
- ❑ Requirements of Provincial or Territorial Associations of Architects
- ❑ Number of Shares and Classes of Shares Held by Each Shareholder
- ❑ Shares Free and Clear of Liens and Encumbrances
- ❑ Warranty of the Corporation Regarding Authorized Capital and Issued and Outstanding Securities
- ❑ Unanimous or Non-unanimous Agreement
- ❑ Termination of Prior Shareholders' Agreements
- ❑ Jurisdiction of Incorporation
- ❑ Incorporation of Articles and Bylaws

Rights and Obligations of Shareholders

- ❑ Permitted Outside Activities
- ❑ Employment of Shareholders
- ❑ Protection of Shareholders
- ❑ Management Contracts with Shareholders
- ❑ Maintenance and Good Standing with Provincial or Territorial Associations of Architects

Default

- ❑ Events of Default
- ❑ Procedure on Default
- ❑ Opportunity to Remedy
- ❑ Consequences of Default

Financing

- ❑ Bank Financing and Signing Officers
- ❑ Calls on Shareholders for Additional Financing
- ❑ Guarantees of Debt of the Corporation
- ❑ Use of Surplus and Net Income
- ❑ Dividends
- ❑ Auditors and Bankers of the Corporation
- ❑

Management of the Company

- ❑ Business of the Company
- ❑ Organization and Management of the Company as per Architects Act
- ❑ Composition of the Board of Directors
- ❑ Limitations on Authority of the Board as per Architects Act
- ❑ Matters for which the Shareholders are to be Notified and Addresses for Notices
- ❑ Officers of the Corporation and Term of Office
- ❑ Appointment and Replacement
- ❑ Time to be Devoted by Officers
- ❑ Remuneration of Officers and Directors
- ❑ Proper Books and Records
- ❑ Meetings of the Directors and Shareholders

Issuance of Additional Shares

- ❑ General Procedure
- ❑ Pre-emptive Rights

Term and Termination Options

- ❑ Effective Date
- ❑ On Death of a Party
- ❑ On Sale of Business
- ❑ Upon There Being One Shareholder

Insurance

- ❑ Lives Insured
- ❑ Payment of Premiums
- ❑ Payment of Benefits under Insurance Policy

Valuation Methods

- ❑ Agreed-to Value
- ❑ Book Value
- ❑ Fair Market Value
- ❑ Formula Value
- ❑ Independent Appraisal
- ❑ Timing of Valuation

Sale of Shares

- ❑ Restrictions on the Transfer of Shares
- ❑ Sale of Shares to a Holding Company
- ❑ Guarantee of Principal of Holding Company
- ❑ Rights of First Refusal
- ❑ Permitted Encumbrances
- ❑ Funding a Buyout
- ❑ Shotgun Clause
- ❑ Auction
- ❑ Option to Purchase/Sell
- ❑ Continued Disability of Shareholder
- ❑ Forced Sale
- ❑ Piggyback Clauses
- ❑ Matched Bids
- ❑ Corporate Share Re-purchase
- ❑ Death or Bankruptcy of Shareholder

General Sale Provisions

- ❑ Notice Periods
- ❑ Resignation of Vendor
- ❑ Cash or Promissory Note
- ❑ Security for Unpaid Balance
- ❑ Provisions Regarding the Restrictions on the Corporation and Shareholders Pending Full Payment of the Purchase Price
- ❑ Default of Payment
- ❑ Retiring Allowance or Consultant's Fee
- ❑ Release of Guarantees and Indemnities
- ❑ General Release
- ❑ Repayment of Debts
- ❑ Failure to Complete Closing
- ❑ Non-competition and Non-disclosure
- ❑ Family Law Considerations
- ❑ Deferred Sale
- ❑ Tax Planning

General Contract Provisions

- ❑ Mention of Shareholders' Agreement on Share Certificate
- ❑ Addresses for Delivery of Notices
- ❑ Mediation and Arbitration
- ❑ Further Assurances
- ❑ Time of Essence
- ❑ Entire Agreement and Amendment
- ❑ Applicable Law
- ❑ Severability
- ❑ Effect of Waiver/Non-waiver
- ❑ Ownership of Intellectual Property and Know-how and Waiver of Moral Rights
- ❑ Confidentiality and Trade Secrets
- ❑ Maintenance of Good Standing with Provincial Association of Architects
- ❑ Loss of Professional Membership of any Shareholder

The foregoing is a list of common concerns and clauses in a shareholders' agreement. The list is not exhaustive, will vary in individual circumstances, and cannot replace legal advice. Architects should consult their lawyers before negotiating or entering into a shareholders' agreement.

Checklist: Issues to Consider when Preparing a Joint Venture Agreement

Establishment of Joint Venture

- ❑ Identification of Architectural Practices
- ❑ Joint Venture Name and Trademark or Logo
- ❑ Place of Business
- ❑ Description of Project
- ❑ Not a Partnership

Management of Joint Venture

- ❑ Formation of Committee
- ❑ Committee to Manage
- ❑ Authority of Committee and Joint Venture Participants
- ❑ Appointment of Individuals and Replacements to Committee
- ❑ Appointment of Project Manager
- ❑ Meetings of Committee
- ❑ Votes Required to Authorize Actions
- ❑ Equality of Votes for each Architectural Practice
- ❑ Prior Consent for Fundamental Acts
- ❑ Co-signatures Required for Important Documents

Responsibilities of each Architectural Practice

- ❑
- ❑ Apportionment of Responsibilities
- ❑ Apportionment of Profit and Loss
- ❑ Maintenance of Good Standing and Architectural Licence
- ❑ Joint Consent for Media Releases
- ❑ Capital Contributions
- ❑ Property Contributions

Financial Matters and Ownership of Property

- ❑ Appointment of Accountant
- ❑ Banking Arrangements
- ❑ Fiscal Year
- ❑ Drawing on Joint Venture Funds
- ❑ Accounting Requirements for each Architectural Practice
- ❑ Authority to Endorse Cheques
- ❑ Approval for Expenses
- ❑ Title to Intellectual Property
- ❑ Insurance Requirements
- ❑ Joint Venture Assets and Assets of Architectural Practices

Term and Termination Options

- ❑ Effective Date
- ❑ Duration of Joint Venture
- ❑ Bankruptcy/Insolvency of Architectural Practice
- ❑ Change of Control of Architectural Practice
- ❑ Material default (with/without Cure Period)

Consequences of Termination

- ❑ Joint Venture Liquidation or Dissolution
- ❑ Return of Property to Architectural Practices
- ❑ Disposition of Property
- ❑ Outstanding Balances Due
- ❑ Ownership of Intellectual Property

Other

- ❑ Settlement Resolution and Arbitration
- ❑ Confidentiality and Trade Secrets
- ❑ Copyright
- ❑ Loss of Professional Membership of any Architectural Practice
- ❑ Further Assurances
- ❑ Addresses for Notice
- ❑ No Assignment of Agreement without Consent
- ❑ Time of Essence
- ❑ Entire Agreement and Amendment
- ❑ Governing Law
- ❑ Severability



2.1 Management of the Practice

2.1.2 Succession Planning

2.1.2

Canadian Handbook of Practice for Architects

2.1.2

Introduction

Options for Succession Planning
- Dissolution of the Practice
- Sale of the Practice
- Merger
- Reapportioning of Ownership
- New Partners or Shareholders

The Strategic Human Resources Planning Process
- Phase 1. Strategic Planning
- Phase 2. Development of the Talent Pool
- Phase 3. Selection and Transition
- Phase 4. Continuous Renewal

The Issues
- Contingency Planning
- Review of Shareholder and Partnership Agreements
- Liability for Past Work
- Payment
- Valuation of the Practice
- Goodwill

Definition

References

Checklist: Items for Consideration in a Buy/Sell Agreement

Succession Planning

Introduction

Principals of architectural firms often neglect or avoid thinking about what will happen to their practice after they retire or leave for other reasons. Planning for this transition — commonly called succession planning — is very important. Effective succession planning will:

- enable architects who own a firm to extend their practice beyond the span of their own careers;
- allow young, emerging architects to develop the skills necessary for future leadership;
- permit owners (of architectural firms) to obtain a financial return on their investment of money, energy, and commitment.

Although of concern to all practices, succession planning is especially important for the many architects who practise in sole proprietorships and small firms. They often have few standby resources and, therefore, face the greatest risk of succession failure.

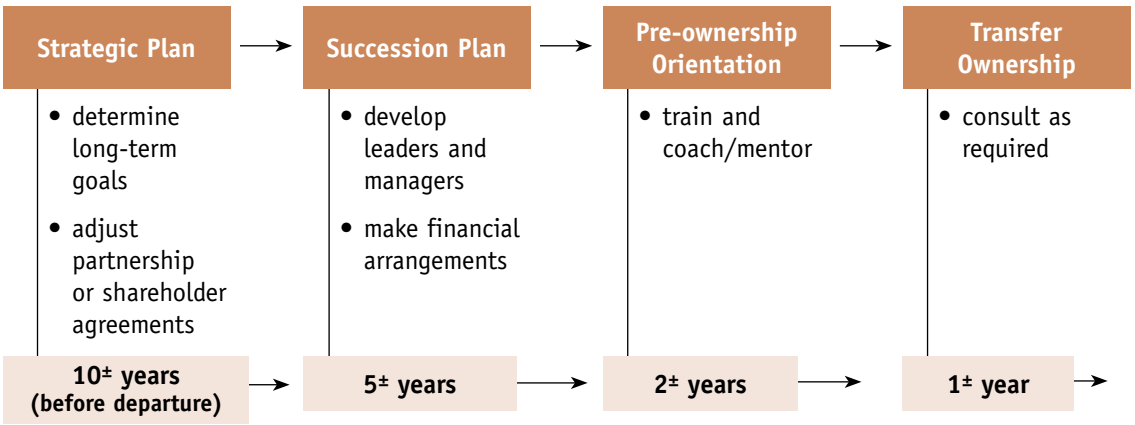
According to management expert Peter Drucker, "the best way to predict the future is to create the future." Effective succession planning requires careful thought and an implementation strategy that can span up to ten years. A good start is to determine one's retirement goals and work backwards to the present. This notion seems elementary, but is complicated to put into practice.

A comprehensive succession plan will:

- set out a transition strategy;
- present a profile of a buyer or buyers capable of taking over the architectural practice;
- establish the financing;
- determine the practice's value;
- deal with tax, legal, and professional liability insurance issues.

Keep in mind the success test for succession planning: Can the departing architect's clients, staff, and legacy be entrusted to the hands of others without any decrease in the firm's level of professionalism and reputation? People may miss the founding architect personally, but they will still be well served if the successors ensure that the firm's professional standards are maintained.

Illustration 1: Timeline for Ownership Transition



Options for Succession Planning

This chapter describes five succession planning options. Each specific practice will have unique characteristics that will result in different chances of success, selling prices or firm valuation, and planning horizons. Actual outcomes will vary according to the size of the firm, and the effectiveness of the strategy and its execution.

Dissolution of the Practice

A disproportionate number of small firms dissolve upon the retirement of the principal architect. Although the dissolution of the practice may seem like a failure of succession planning, this option may be necessary in some situations, for example:

- death;
- illness;
- disability;
- divorce;
- shareholder or partner dispute;
- personal choice;
- bankruptcy.

Contingency planning may reduce the need to resort to this option.

Architects who choose to retire and dissolve the practice should:

- comply with all provincial regulations regarding withdrawal from practice;
- secure a policy for professional liability insurance coverage for retirement years.

Contingency planning under this option should ensure that the practice's drawings and documents are not lost or destroyed, but retained. They can be transferred to:

- another architect;
- an archiving agency such as a university or a provincial or national archive;
- some other acceptable organization;
- a storage facility.

Some provincial associations have regulations requiring retention of an architect's archives. Regardless of whether regulations exist, archives must be retained because of the varying statutes of limitations on an architect's liability (refer to Chapter 2.1.9, *Risk Management and Professional Liability*).

Sale of the Practice

The firm could be sold to an architect or architects outside the practice. It is common practice for the "founders" to be retained by the "successors" as advisors or consultants for a period of time to ensure a smooth transition for both the practice and ongoing projects.

Advantages:
- may sustain the firm's legacy;
- may yield some financial return for the founding architect.

Disadvantages:
- the seller is unlikely to have much influence over the firm's future style or philosophy;
- outside principals will usually pay less for the practice than will inside successors, due to the valuation of goodwill.

Merger

Merging the practice with another architect or firm may be a very good option if the founding architect is one to three years away from retirement and if there are no internal staff available or capable of sustaining the practice. This option is similar to selling the practice in that persons previously external to the firm will have managerial influence over the practice. A significant difference is that the retiring architect may retain greater influence over the future of the composite entity.

However, mergers can fail for a wide variety of reasons, including:

- incompatiblity of corporate culture or style of practice (refer to Chapter 2.1.1, *Organization of an Architectural Practice*);
- incompatibility of software platforms, information technology systems and internal firm structures;
- diversion of resources away from architectural practice as a result of focusing solely on the merger;
- inadequate research or concealment of liabilities by one of the partners;
- redundant staff who are retained resulting in inefficiencies; or conversely,
- reductions to operations or personnel, thereby losing expertise and employee culture. When mergers are unsuccessful, the primary reason is that the two firms do not fit well together. Consequently, the architect

may wish to test the fit before finalizing a formal merger by first entering into a joint venture and/or strategic alliance. Ideally, the new firm will be greater than the sum of the parts, and able to increase its competitive position and market opportunities.

Reapportioning of Ownership

Ownership can be distributed in different proportions to existing partners or shareholders. This option is only available if the firm has other partners and shareholders who are prepared to buy the retiring principal's shares. In these situations:

- if the demand for the shares is high, the seller will usually be able to obtain a higher price under this option than through a sale or merger because internal buyers typically value the acquisition more than do external buyers;
- if all goes well, the sustainability of the practice is high — especially if the existing partners are capable leaders.

New Partners or Shareholders

Inviting new architects or others to become part of an existing practice as partners or shareholders is another option, if the existing partners:

- are close to retirement; or
- want to develop younger talent.

If executed well, this option has a good chance of success. The selling price will also be high, especially if the new shareholders have the cash resources to fund the transfer of ownership. A longer planning horizon is generally required to properly develop people from within the internal talent pool and to give the buyer more time to provide payment for the share transfer.

The following illustration summarizes some of the differences between succession planning options.

Illustration 2: Succession Planning Options

Options	Origin of Successor	Success Probability	Selling Price	Planning Horizon
Dissolve the practice	—	—	—	0-1 year
Sell the practice	external	low	low	1-2 years
Merge the practice with another firm	external & internal	medium	medium	1-3 years
Reapportion ownership among existing partners or shareholders	internal	medium/high	high	1-5 years
Accept new partners or shareholders	internal & external	high	high	3-10 years

External means outside the architectural practice
Internal means within the architectural practice

The Strategic Human Resources Planning Process

Succession planning is most successful when leadership can be transferred gradually within the architectural practice. This process can take up to ten years of internal staff development time and encompasses the following four stages:

Phase 1. Strategic Planning

- know the firm's culture because leadership begins with an understanding of the firm's values;
- develop a strategic plan, which is essential for the firm to effectively integrate business components such as:
  - marketing;
  - production;
  - information technology;
  - finance;
  - human resources;
- realize that the strategic plan will provide a framework for more detailed human resource development.

Phase 2. Development of the Talent Pool

- identify and communicate the measures that future leadership must take to maintain staff commitment and motivate people to achieve success;
- assess existing staff and acquire new talent in areas of deficiency;
- provide opportunities for leadership and cross-functional experience;
- establish a meaningful performance evaluation system to monitor and foster ongoing development through:
  - coaching;
  - review;
  - feedback on performance achievements and performance gaps;
- keep in mind that ownership is not an end in itself, but a way to give a financial incentive to the person identified as a major contributor to the firm;
- implement a continuing education program to nurture the acquisition of professional knowledge.

A common concern regarding staff education programs is that only a limited number of staff groomed for promotion will actually advance within the firm, while others may leave and become informed competitors. While it may seem counterproductive to train potential competitors, remember that: "the only thing worse than training your employees and losing them, is not training them and keeping them" (Zig Ziglar).

Phase 3. Selection and Transition

- select a successor or successors and monitor their ongoing development and performance;
- provide prospective successors with a transition period to management and ownership which involves:
  - management training;
  - leadership development;
  - orientation before taking ownership;
  - professional development to achieve the stature of a senior partner;
  - the introduction of successors to clients and other external business contacts.

Phase 4. Continuous Renewal

- relentlessly continue the process;
- watch for opportunities to use the experience and succession plans of the other owners (if any) to regularly facilitate a staged ownership transition upon successive retirements.

It is healthy to continue with professional involvement after ownership transition/retirement through such activities as mentoring, community service, and committee work.

The Issues

Architects must consider a variety of specific issues during the succession planning process.

Contingency Planning

Such planning is important because it:

- allows for faster succession in case of unforeseen circumstances such as illness, disability, divorce or shareholder/partnership disputes;
- minimizes risk of failure by making the succession plan more flexible, and by building the talent pool.

Review of Shareholder and Partnership Agreements

When reviewing agreements, sellers should:

- seek professional accounting advice and legal counsel when drafting or amending shareholder/partnership agreements;
- ensure that agreements have a termination clause which addresses misfits or poor performers or those with a mental or physical incapacity;
- conduct a detailed regular review of the agreements with new/prospective owners to ensure the ongoing appropriateness and relevance of the agreements.

Liability for Past Work

Generally, the liability for past work stays with the practice, although some insurers or provincial jurisdictions may hold the original principal responsible. Thus, it is important to:

- verify whether individual protection against potential long-term liability exposure after succession should be maintained;
- seek professional counsel for guidance within a specific context and legal jurisdiction.

Payment

Keep in mind that:

- many prospective internal buyers may have a high personal debt load;
- buyers may encounter difficulties providing payment for the acquisition of shares during the succession period;
- it is a significant advantage for the practice to be highly profitable during this period, especially if buyers expect to finance the purchase from the practice's earnings through increased salaries or bonuses;
- the buy-in must be feasible and attractive to new principals;
- a "sinking fund" could assist the second-generation owners to buy-in and pay-out the first-generation "founders."

Valuation of the Practice

The value of the practice may be estimated through:

- earnings capitalization;
- discounted net cash flow;
- excess assets;
- goodwill;
- a modified book value procedure that recognizes the economic worth of the firm (the net realizable value, or NRV) as opposed to an historic assessment based upon generally accepted accounting principles. In most cases, the firm's accounting records are an objective starting point to begin the process of determining the NRV.

Sellers and purchasers should seek independent professional advice when estimating the value of the practice.

Goodwill

Goodwill is a subjective asset. Keep in mind that:

- intangible assets are difficult to evaluate;
- goodwill is often over-valued by the seller because of emotional considerations and under-valued by the buyers due to self-interest;
- the valuation gap between buyers and sellers is even more pronounced when the buyer is from outside the architectural practice;
- the valuation of specific intangible factors "should be restricted to those assets whose utility can be transferred to other parties independent of the business and therefore have some hope of a value in exchange. Even for these, hard evidence should be available to justify the basis of valuation." (Skinner)

Definition

Goodwill: The intangible element of the value of a business (including the worth of the architect's legacy, image, and client base) calculated as the amount by which the value for sale or investment exceeds the sum of net identifiable assets. This is sometimes measured as the current value of expected future earnings in excess of the return required for sale or investment, or calculated as a multiple of earnings performance averaged over a period of five or more previous years.

References

Barlow, Kenneth J. *Internal Transfer of Ownership: A practical guide for consulting professionals*. Clarkson, Ont.: Clarkson Publishing Ltd., 1986.

Kogan, Raymond F., AIA. *Strategic Planning for Design Firms*. United States, 2007

Royal Architectural Institute of Canada (RAIC). *Firm Valuation*. RAIC Practice Builder. Ottawa, Ont.: RAIC.

Skinner, Ross. *Accounting Standards in Evolution*. Toronto, Ont.: Holt, Rinehart and Winston of Canada, 1987.

Stasiowski, Frank A. *The Complete Guide to Ownership Transition*. Newton, MA: PSMJ Resources, Inc., 1996.

Stratem Consultants, Inc. *Succession Planning Within Consulting Engineering Firms*. Ottawa, Ont.: Association of Consulting Engineers of Canada, 1996.

Checklist: Items for Consideration in a Buy/Sell Agreement

Identification of Business and Payment

- ❑ Assets — Land and Leases Inventory, Work In Progress (WIP), Supplies & Equipment, Goodwill, Contracts & Royalties, Accounts Receivable
- ❑ Liabilities
- ❑ Purchase Price, Deposit, Payment of Balance — Cash, Shares, Earn-out Security for Payment
- ❑ Terms of Letter of Intent

Securities and Other Regulations

- ❑ Securities Act Compliance and Exemptions
- ❑ Change of Control of Ownership
- ❑ Investment Canada — Exemption, Notification or Reviewable Transaction (for foreign purchasers)
- ❑ Bulk Sales Act Requirements
- ❑ Provincial Architects Acts

Pre-Closing Matters

- ❑ Insurance and Good Faith Operation of Business until Closing
- ❑ Preview and Seek Required Consents (e.g., from landlord, etc.)
- ❑ Right to Conduct Due Diligence
- ❑ Documents to be Delivered on Closing
- ❑ Independent Legal Advice
- ❑ Other Condition Precedents to Closing

Tax Issues

- ❑ Allocation of Purchase Price
- ❑ GST or HST and Tax Rollovers
- ❑ Tax Filing on Deemed Year End
- ❑ Non-Resident Vendors Tax Certificate
- ❑ Land Transfer Tax
- ❑ Loss Carry Forwards and other Tax History
- ❑ Retail Sales Tax

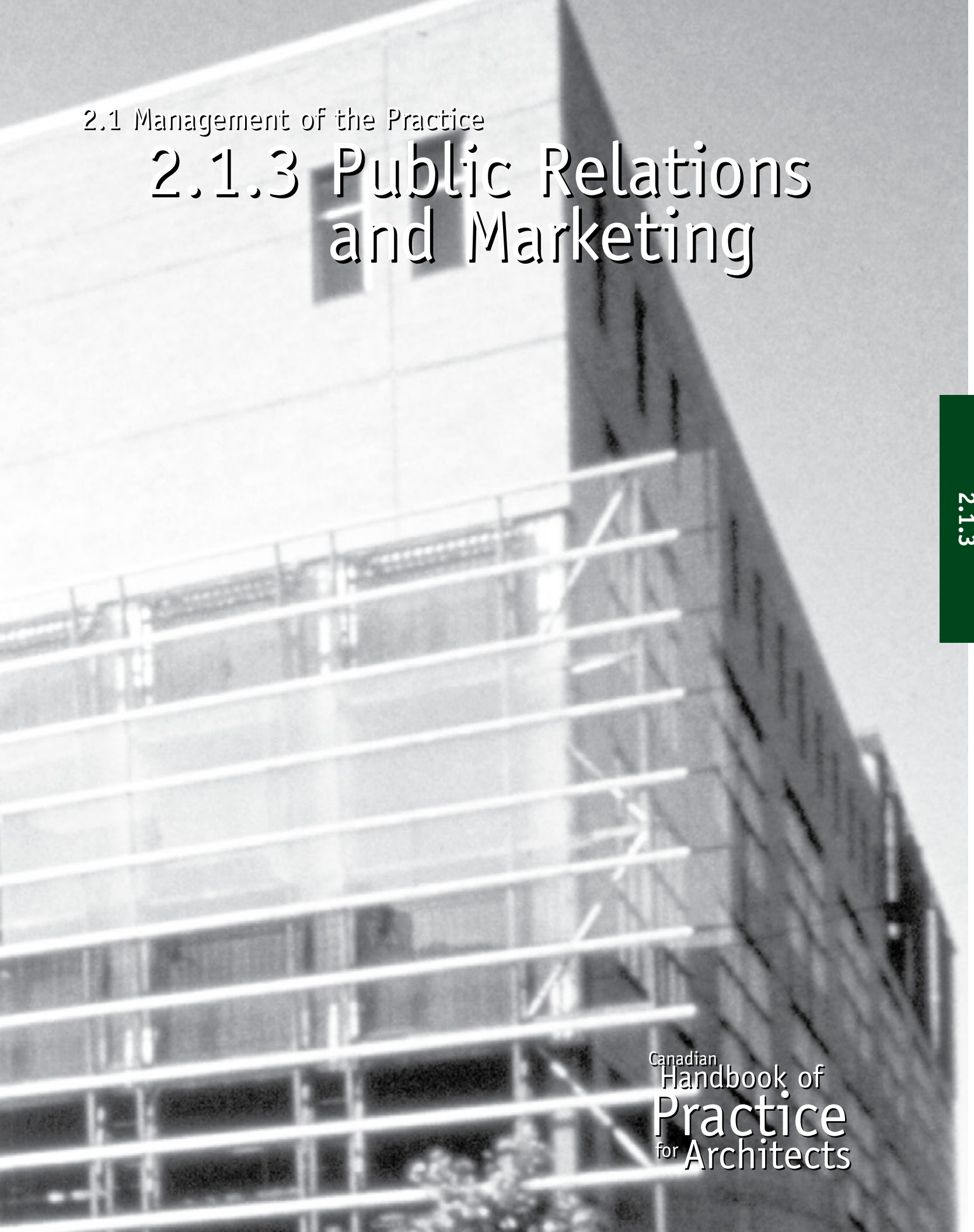
Representations and Warranties of Vendor and Due Diligence of Purchaser

- ❑ Employment and Consultant Agreements
- ❑ Employment Standards
- ❑ Employee Benefit and Pension Plans
- ❑ Environmental Matters
- ❑ Threatened or Pending Litigation or Outstanding Judgements
- ❑ No Other Purchase Agreements Outstanding
- ❑ Contractual and Regulatory Approvals
- ❑ Incorporating and/or Partnership Documents and Licences
- ❑ Compliance with Incorporating and/or Partnership Documents
- ❑ Financial Statements
- ❑ Partnership or Shareholder Agreement
- ❑ Indebtedness
- ❑ Commitments for Capital Expenditures
- ❑ Tax and Source Deductions and Remittances
- ❑ Restrictions on Doing Business
- ❑ Clients and Outstanding Agreements
- ❑ Good Standing of Agreements
- ❑ Affiliations and Joint Ventures
- ❑ Insurance
- ❑ Government Assistance
- ❑ Liens, Charges, and Title to Assets
- ❑ Construction Liens affecting the Practice
- ❑ Real and Intellectual Property
- ❑ Leases of Equipment
- ❑ Condition of Property and Equipment
- ❑ Status of Vendor, i.e., Bankruptcy, Citizenship, Arms Length

Post-Closing Matters

- ❑ Non-Competition — Continuing Employment
- ❑ Confidentiality
- ❑ Employees — Restructuring Employment
- ❑ Release by Vendor
- ❑ Announcements
- ❑ Releases from Guarantees
- ❑ Indemnities and Set Off of Obligations
- ❑ Other Obligations Continuing After Closing

The foregoing is a list of common concerns and clauses in agreements for the sale of a practice. The list is not exhaustive, will vary in individual circumstances, and cannot replace legal advice. Architects should consult a lawyer before negotiating or entering into such an agreement.



2.1 Management of the Practice

2.1.3 Public Relations and Marketing

Canadian Handbook of Practice for Architects

2.1.3

Introduction

Public Relations

Marketing

Marketing: Two Points of View
- The Architect's Perspective
- The Client's Perspective

Professional Relationships

Promotion
- Building Market Awareness or a "Brand"
- Reinforce Interest
- Generate Client Commitment
- Supporte the Commission

Promotional Material and Proposals

Competitions

References

Public Relations and Marketing

Introduction

> *Marketing and public relations are an integral part of every architect's practice. Firms of every size and type must devote some level of attention to securing commissions and bringing their work before the public.*
> (Cooper and Moore)

As the above quotation points out, today's architectural practice must develop a public relations and marketing strategy to succeed and flourish.

Public relations for architects involves communicating the value of architecture and of their architectural practice to a wide range of audiences. Public relations is directed to the community at large, whereas **marketing** usually focuses on specific projects and clients. A coordinated and integrated strategy is a necessary part of promoting and growing a successful architectural practice and acquiring new projects.

This chapter briefly discusses public relations and marketing within an architectural practice.

Public Relations

Public relations is a series of activities which provide opportunities for the architect to become known in the community. Good public relations sets the stage for successful marketing.

These activities may include:

- community involvement, such as:
  - giving lectures and speaking in public on architectural topics;
  - conducting seminars;
  - sitting on volunteer boards;
  - joining service clubs;
  - providing "pro bono" architectural services to community organizations;
  - conducting design charrettes;
  - sponsoring community events;
- good media relations, such as:
  - issuing news releases;
  - contributing to architectural blogs;
  - publishing technical papers, or articles in journals;
  - participating in trade shows;
  - undertaking professional criticism of architectural projects;
  - entering design competitions;
  - preparing and distributing newsletters for the practice;
  - promoting design or architectural awards.

Architects should strive to better inform the public about the value of design and architecture and architects. Public awareness about the value of architectural services can open new markets for the architectural practice and helps to create a receptive environment for the architect in future marketing activities.

Marketing

Many architects contend that "marketing" should be a significant element of the "Strategic Plan" of all architectural practices. (Refer to Chapter 2.1.1, *Organization of an Architectural Practice*, for a brief discussion of a strategic plan.) Marketing activities can vary widely based on the size of the practice; however, all firms should establish an appropriate annual budget for marketing. Marketing is not merely overhead; there is a correlation between a firm's profit and growth and the amount spent on marketing.

Some people distinguish between "marketing" and "selling." In an architectural context, marketing includes everything related to business development, including the planning and administration of all marketing activities, as well as obtaining new clients and ensuring the delivery of high standards of architectural services for repeat business. Selling essentially

means identifying who requires architectural services and securing the commission. Marketing should engage the architect in the never-ending pursuit of client satisfaction. It compels every architect to search out new ways for efficiently meeting, or exceeding, client expectations. The architect must learn to be "client" oriented rather than "production" or "design" oriented. Refer also to Chapter 1.2.2, *The Client*.

Marketing as a *process* involves identifying potential clients. Marketing must be part of the practice's strategic plan and an effective marketing strategy sub-divides "market demand" into manageable segments. Each segment is made up of a group of potential clients who share common needs, attitudes, and behaviours that are different from other market segments. By bringing these similarities and differences into clearer view, it is easier to identify:

- who to pursue for future projects and architectural services;
- what to include and highlight in presentation material;
- potential risks and rewards from each market segment.

Refer also to the "GO NO-GO Checklist to Assess the Degree of Risk" in Chapter 2.1.9, *Risk Management and Professional Liability*.

The marketing terms and concepts of "client satisfaction," "value creation," and "market segment" require that marketing be integrated into the daily operations of the architect's practice. It is useful to track the "proposal closing rate," that is, to identify the number of successful commissions compared to the number of proposals prepared. The "proposal closing rate" can be compared with various marketing activities to determine which methods work best for the practice. Ongoing marketing as a part of the daily routine of all principals will help control the type, amount, and pace of the practice's work.

Marketing: Two Points of View

In developing a marketing plan, all activities must be viewed from two different perspectives:

- the perspective of the architect or architectural practice;
- the perspective of the actual or potential client.

The Architect's Perspective

To develop a marketing strategy, the architect must answer the following questions:

- What types of client and project does the practice want?
  - individual, corporate or institutional?
  - what type of reputation?
  - what size of construction budget?
  - what type of building?
  - what values regarding design and project management?

- What service does the practice want to provide for these clients?
  - what are the firm's strengths?
  - what are the firm's interests and aspirations?
  - what are the firm's capabilities?

- How does the practice want to provide these services?
  - geographically?
  - with what resources?
  - technologically?

- Why does the practice want to do this?
  - to meet lifestyle goals?
  - to meet career goals?
  - for financial reasons?
  - to satisfy architectural goals?
  - to satisfy ideological or altruistic beliefs?

- How will the work be carried out?
  - composition of design team?
  - financial arrangements?
  - operational arrangements?

- What are the risks involved?
  - with this particular client?
  - for the services offered?
  - for the fees charged?
  - in the place of the work?
  - for marketing and promotion to win the project?
  -

The Client's Perspective

Marketing should be considered from the client's point of view. Other partners or associates in the practice can help to develop and analyze this perspective. Client satisfaction surveys can also help in this process.

The strategic plan should help to identify the following:

- the market segments that are of interest to the practice;
- the prevalent needs, wants, and behaviours among prospective clients in these segments;
- the future of this market segment.

It is helpful to ask questions about competitors to determine the competitive position of the practice:

- Within each market segment, who are the main providers of architectural services?
- What is their share of the market?
- What is the basis for their competitive advantage?
  - personal relationship?
  - fees?
  - specialized architectural services?
  - reputation for quality/leading-edge design?
  - promotion?
  - location?
- Can your practice make an offer that is unique and compelling to prospective clients given the other choices available to them?
- What drew former clients to this practice?

Once some of the elements of a marketing plan have been determined, potential clients or "leads" need to be identified. Some techniques for identifying "leads" include:

- compiling names of the potential clients or purchasers of architectural services in each of the preferred market segments;
- developing a list of organizations and the person(s) responsible for decisions related to architectural services, and for the selection of the architect;
- monitor relevant articles from the media;
- organizing business development meetings;
- networking;
- surveying past clients;
- researching Web sites;
- consulting MERX or other similar websites hosting project opportunities.

MERX is an electronic project information service mainly for public-sector contracts. Federal, provincial, and territorial governments — as well as certain institutions in the "MASH" sector (municipalities, academic institutions, school boards, and hospitals) — use MERX for posting project opportunities and bids in Canada. The Web site for MERX is *www.merx.com*

The best source for both new business and new business leads is from existing or former clients.

Once leads have been identified, these prospects should be qualified by determining:

- their current and potential demand for architectural services;
- the main criteria they will use to select an architect.

A wide range of "contact" software is available. This type of software tracks leads and potential clients as well as the frequency and type of contact (for example, telephone call, letter, luncheon date).

The practice should situate each lead in the appropriate stage of the relationship-building process and plan the details of subsequent marketing and promotion. An action plan can then be prepared for each lead or prospect.

After an initial contact, the practice should evaluate the response from each lead and adjust the action plan based on:

- the prospect's reputation and potential as a client;
- the likelihood of the project proceeding;
- the architectural practices from which the prospect will solicit proposals;
- the likely value of the commission;
- the risks attached to winning the commission;
- the cost of pursuing the prospect further.

In pursuing the lead, the architect should remember that a prospective client may actually include several people:

- those who influence the decision-makers — "influencers" in marketing jargon;

- the decision-makers themselves — "buyers" in marketing jargon.

Professional Relationships

If one function of marketing is to create value and client satisfaction, the best form for achieving these is through a long-term, contractual relationship. True value will emerge from the provision of consistent, committed, efficient, and high-quality service over time.

Service in this context is not limited to design: architects are often asked to fulfil a number of roles such as facilitator, efficiency expert, construction cost control, mediator, and problem-solver. Building professional relationships, or "relationship marketing," should be a major part of a marketing plan. A professional relationship is started when a prospective client attaches an image to an architect's name.

Promotion can play a role in developing a relationship. Usually, a professional relationship begins when a prospective client is about to select a consultant. Although the initial contact may not result in a commission, the architect should take advantage of the situation and start to build a solid long-term relationship with this prospective client.

Promotion

Promotion is providing information, motivation, and direction to those individuals who will decide on the timing and terms of selection of an architect. Promotion leads the architect to prospective clients and provides the opportunity to propose a potential offer for services, instead of leaving the opportunity to chance, circumstance or the competition.

The success of effective promotion, like effective design, is based on the efficiency with which the promotion brings about the desired response. Effective promotion brings the right message at the right time to the right audience using the right medium. Promotion must be a proactive activity that aligns with the strategic and business plan of the practice. There are various phases in promotion, such as:

Build Market Awareness or a "Brand"

The marketplace needs to know about the architectural practice. Often this is achieved by developing and then constantly reinforcing a "brand" for the architectural practice.

A brand is the combination of attributes and symbols (such as name, logo, slogans, symbols and designs) that convey the essence of the architectural practice and its services. Brand recognition is directly relating to marketing design, media commentary and public recognition. An important objective in developing a brand is to create a relationship of trust.

The architect should promote the practice and its service, and disseminate the following information:

- the name of the practice and all contact information;
- what distinguishes the practice from the competition;
- the services available;
- the preferred building type(s);
- business, architectural, and financial credentials;
- the reasonableness of fees in relation to the quality of service;
- the performance record;
- the skills and availability of principals and staff;
- evidence for substantiating all such claims.

The objective at this stage of promotion is to motivate potential clients to want to learn more about the architect, and to tell them how to get more information about the practice.

Some techniques for building market awareness include:

- corporate stationery and business cards;
- directory listings;
- articles, such as those published:
  - by members of the firm;
  - about the firm and its work;
- lectures and speeches;
- exhibits;
- sponsorships;
- membership in community organizations;
- philanthropy;

- volunteerism;
- original research and surveys;
- websites which:
  - create a presence on the Internet and a convenient method for displaying images of built work and designs;
  - provide clients and project team members with access to information about a specific project;
  - provide useful information to the public about the built environment.

Reinforce Interest

"Awareness-building" should result in prospective clients wanting to learn more about the kinds of services the architect can provide. In reinforcing the interest of a potential client, communications should progress from supplying general to more specific information on how the practice can fulfil the client's needs. This may involve responding to formal Requests for Proposals.

To reinforce interest, the firm can use:

- brochures;
- Web pages;
- slide presentations, videos, and computer presentations;
- display boards;
- exhibits;
- letters of introduction;
- postcards or greeting cards;
- direct mail;
- newsletters.

Generate Client Commitment

If the prospective client's interest is met or surpassed, the prospective or potential client should perceive that a "fit" is possible. It is critical at this stage to "know" your client. The challenge then becomes to discuss, and then negotiate, the various terms of an agreement. The prospect may be conducting similar negotiations with other architects at this stage.

In order to generate client commitment, consider:

- one-on-one interviews and presentations;
- portfolios (including targeted portfolios);
- photographs and videos;
- customized computer presentations;
- models of previous projects;
- proposals.

Support the Commission

Once the contract has been executed, the architect should take steps to ensure that the new client understands how much the architect values the commission. Just what action should be taken to develop and maintain a professional relationship depends on the architect, the client, and the value of the contract. This relationship should be sustained even beyond the completion of the project through the following methods:

- announcements or news releases;
- advertisements;
- special events;
- newsletters;
- greeting cards.

Promotion Materials and Proposals

Promotional material should be gathered during the course of a project. As projects are completed, every architectural practice should establish standard procedures to document information needed for presentation material or firm brochures. Refer to Chapter 2.3.1, *Management of the Project*, for details on assembling material as part of the office routine at project closeout.

In preparing promotional brochures or proposals, the architect must:

- **always provide the proper credit** for all projects (to avoid misrepresentation, describe the role of the architect in each project accurately);
- **notify references** that their names will be used and request permission for their use (if the response is enthusiastic, request a letter of reference which can be used in promotional material and brochures; however, if the client is reluctant it may be prudent to avoid using the reference).

Refer also to Chapter 2.1.6, *Communications*.

When preparing proposals, the architect should ensure that the fee, if requested by the prospective client, will be adequate to provide the appropriate services. Refer to Chapter 2.1.9, *Risk Management and Professional Liability*.

Competitions

A few architects establish their reputations through architectural competitions.

Guidelines for the conduct of competitions can be found on the RAIC website at: *www.raic.org/architecture_architects/architectural_competitions/index_e.htm*

Architectural competitions for buildings must be endorsed or approved by the Council of the provincial or territorial association of architects and/or the Royal Architectural Institute of Canada. Open and limited competitions for buildings require endorsement as most provincial associations of architects prevent their members from participating in competitions that have not been approved by their Councils.

Endorsed competitions require the engagement of an architect as a professional advisor, who is responsible for:

- advising the owner or sponsor;
- preparing the conditions of the competition;
- making arrangements for the competition.

International competitions for architectural projects may be conducted under conditions unique to the country holding the competition. The International Union of Architects (UIA) has also prepared guidelines for conducting international architectural competitions in its publication, *Instructions and recommendations to promoters of international competitions in architecture and town planning*.

Architectural competitions can be a high risk activity for any architectural practice and therefore each practice must evaluate the effort and return on investment for participating in an architectural competition.

References

Cooper, David and Barry M. Moore. *Marketing and Public Relations*. Washington, D.C.: The American Institute of Architects Press, 1988.

International Union of Architects (UIA). *Instructions and recommendations to promoters of international competitions in architecture and town planning*. Paris, France: UIA, 1978.

Linton, Harold, Laura Clary, and Steven Rost. *Marketing for Architects and Designers*. New York, N.Y. : W.W. Norton and Company Inc., 2005.

Pickar, Roger l. *Marketing for Design Firms in the 1990s*. Washington, D.C.: The American Institute of Architects Press, 1991.

PSMJ Resources, Inc. *Marketing Tactics*. A monthly journal. Newton, MA.

Royal Architectural Institute of Canada (RAIC). *RAIC Practice Builders*. Ottawa, Ont.

An Intense Look at Decision Makers.

60 Winning Proposal and Presentation Tips.

Strategic Planning = Market Share.

Tips for Successful Marketing.

Building with Media.

Shenson, Howard L. and Jerry Wilson. *138 Quick Ideas to get more Clients*. Toronto, Ont.: John Wiley & Sons, Inc., 1993.

Stone, David A.

Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives, Inc., 1999.



2.1 Management of the Practice

2.1.4 Financial Management

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Annual Budget Calculation Sheet

Office Overhead: Includes expenses for rent and utilities, office supplies, computer maintenance, automobile expenses, promotion and advertising, books and subscriptions, annual dues, leasing expenses (except as noted below), postage, delivery services, bank charges, interest charges, business taxes, donations, seminar and training expenses, and depreciation. [Note: consultant expenses, which are required to provide architectural services, are excluded from overhead. However, other consultants such as legal, accounting, and marketing are included in overhead expenses. The purchase or lease of major expenditure items such as automobiles, computers or office renovations are charged as office overhead only to the extent that such expenses can be depreciated in accordance with tax regulations.]

Payroll Burden: Includes required contributions by the employer (statutory benefits), including Employment Insurance (EI), Canada Pension Plan/Québec Pension Plan (CPP/QPP), health taxes, and workers compensation in addition to discretionary benefits such as insurance and pension plans, and bonuses.

Payroll Records: A record of salaries, taxes due and paid, and payroll burden for each employee.

Profit: An excess of revenue over expenses.

Project Cost Control Chart: A financial record of each project, which includes professional fees, consultants' fees, staff time expended, budgeted time, expended payroll, and profit and loss for each phase of the work.

Staff Utilization Records: Identifies monthly and year-to-date hours spent by each staff person on direct labour for projects, as well as hours for vacation, holiday time, sick leave, and miscellaneous overhead duties. The record should indicate a percentage of direct (billable) to indirect (non-billable) time. These records are used to develop billing rates for individual staff members, as well as for short- and long-term planning.

Statement of Income and Expenses: A report, often prepared monthly, documenting all income, all expenses, and the resulting profit or loss.

Tax Records: Includes personal income taxes, corporate taxes, and GST or HST.

Work-in-Progress (WIP): Work underway or complete but not yet invoiced.

References

Dauderis, Henry. *Basic Accounting*. Toronto, Ont.: Holt, Rinehart and Winston, Inc., 1978.

Getz, Lowell.

Financial Management for the Design Professional. New York, NY: Whitney Library of Design, 1984.

An Architect's Guide to Financial Management. Washington, D.C.: The American Institute of Architects Press, 1997.

Stasiowski, Frank A. FAIA. *Dollars & Sense — PSMJ's Guide to Financial Management*. Newton, MA: PSMJ Resources, Inc., 1997.

Stone, David A.

Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives, Inc., 1999.

Financial Management

Introduction

This chapter will provide a short introduction to financial management, an essential activity for every architectural practice. Good financial management systems will help the practice reach its strategic objectives as well as financial goals.

Profit

The practice of architecture is a business and must produce a profit. Appropriate financial planning should always include a reasonable profit, and it is advisable to set aside a percentage of the profit as a capital reserve. Proper tax planning will affect the amount of profit withdrawn from the practice and this amount may be distributed to owners or shareholders (if the practice is incorporated). After a percentage of the profit is set aside as a capital reserve, the balance may be distributed to shareholders (if the practice is incorporated) and to staff. In "lean" years, the capital reserve may be very little or non-existent; however, in "very profitable" years, the capital reserve could be as much as 50% of the practice's profit.

A profit is required in order to:

- build a reserve for cyclical downturns;
- purchase assets;
- pay out retiring or dismissed employees;
- build a successful financial history for borrowing funds;
- invest in research and professional development;
- to fund bonus programs;
- reward owners for efforts expended and risks taken.

Distribution of bonuses to staff should be based on the practice's established policy and on factors determined in a performance review, such as:

- ability;
- productivity;
- professional growth.

Refer to Chapter 2.1.7, *Human Resources*, for information on performance reviews.

When the practice is owned by shareholders or partners who have invested capital in the practice, their investment should earn interest at the bank's prime rate of interest, plus an additional percentage which represents a reasonable return for their financial risk.

Financial Planning

Financial planning should be a part of the strategic plan of every architectural practice. It is the basis for managing an architectural practice, and should include:

- strategic goals and objectives of the practice;
- revenue projections;
- goals for profit;
- budgets for overhead expenses, including any new capital expenditures;
- staffing plans, including number and type of staff.

This financial plan should identify income and expenses projected for any new direction for the practice, for example, the delivery of new services and associated costs required to:

- hire staff;
- undertake research and marketing;
- buy or lease new premises;
- finance professional development and training;
- purchase or lease new furnishings, equipment, and software.

If the practice must downsize as a result of an economic downturn or for another reason, a financial plan is necessary to resolve issues, such as:

- relief from a lease for office space;
- the need to lay off staff (refer also to Chapter 2.1.7, *Human Resources*).

Short-term financial planning, usually called **budgeting**, covers a time period of 12 months primarily because of the requirements for annual financial statements and the normal fiscal year. Budgets show projected income and expenses.

The budget — including all income, expenses, and profit — should be constantly monitored, usually on a monthly basis. The budget should also record the previous year's revenue and expenses, as well as the difference between the budgeted and actual revenue and expenses.

Projected income includes:

- work-in-progress;
- anticipated professional income (based on the previous year's records);
- other anticipated income.

Projected income must be adjusted to account for the current and projected economy in the construction industry and any extraordinary conditions.

Projected expenses include:

- estimated expenses (based on the previous year's records);
- changes in expenses which have occurred or will occur (such as staff pay raises or rent increases);
- increased expenses to meet long-range planning targets, for example:
  - increased staff requirements;
  - increased office space or other overhead expenses.

Profits are usually estimated as a percentage of projected revenues and should be identified in relation to the long-range financial plan.

An architect can use the "Annual Budget Calculation Sheet" at the end of this chapter to help prepare an annual budget.

Both budgeting and long-range financial planning should include appropriate salaries — commensurate with ability and experience — for principals, directors and shareholders.

Accounting

Accounting provides information useful for making financial and economic decisions. There are two types of accounting:

- internal accounting;
- external accounting.

Internal accounting, sometimes called management accounting, is done within the architectural practice — often by staff, a bookkeeper, or other professional such as a comptroller.

External accounting, usually performed by an independent accountant, frequently includes the preparation and examination of financial statements in order to express an opinion on the financial position of the practice.

An audit is an independent and objective examination of accounting records and other necessary documentation in order to express an opinion on the fairness of a balance sheet and other financial statements.

Accounting Systems

Records of accounting are statutory requirements. The better and more accurate the records, the greater the opportunity for more accurate long-range planning and budgeting and, in turn, the greater the opportunity for profit. There are two different systems of accounting:

- cash system;
- accrual system.

Cash System

The **cash system** records each "cash" transaction as it occurs, using two types of entries:

- income or receipts;
- expenses or payments.

Entries begin with the bank balance, and they are made in three columns as they occur:

- deposits or income (first column);
- payments or cheques issued (second column);

- the running balance (third column).

[Note: a negative balance is identified with brackets or with a minus (-) sign.]

Although the cash system shows the actual cash position at any given moment, it is of little value for financial statements and does not provide any information related to profit and loss.

Accrual System

The **accrual system** records all income — including work-in-progress — and expenses as they occur in the general ledger. It shows the current financial position of the architectural practice, usually on a monthly basis.

Using the accrual system, two types of financial reports are prepared:

- statement of income and expenses;
- balance sheet.

Statement of Income and Expenses

A **statement of income and expenses** provides:

- a summary of income, including work-in-progress;
- expenses incurred against all income, including work-in-progress;
- an accounting of profit or loss for the time period.

Most accounting software will provide this information at regular periods.

The statement has three principal components:

- income;
- expenses;
- profit.

Income includes:

- professional fees invoiced [Note: fees for consultants should be retained and may be put into a separate account until due and payable];
- work-in-progress [Note: if all accounts are invoiced monthly, reporting of work-in-progress is not necessary];
- reimbursable expenses invoiced;
- interest income;
- miscellaneous income.

Income recording can also be sub-divided to identify income from separate offices or separate areas of practice, or by individual projects.

Expenses include:

- salaries [Note: this can be sub-divided into categories such as principals (partners or directors), professionals, technical staff, support staff];
- payroll burden;
- consultants' fees;
- overhead expenses, sub-divided by category.

Refer to Illustration 1 for a typical "Statement of Income and Expenses" for a medium-sized architectural practice. This statement would be prepared after all financial records for the fiscal year had been completed. The left-hand column reflects a **history** of the practice's financial activities. The right-hand column illustrates a budget or **future** financial activities based on anticipated revenue and expenses. The increased revenues may be predicted as a result of recently acquired projects or a buoyant economic environment. Similarly, an increase is projected for wages and benefits as more staff will be required to undertake the increased workload. Other costs are projected to increase proportionately as a result of increased staff and work.

Balance Sheet

Usually an accountant will prepare annual financial statements, including a **balance sheet** and a 12-month statement of income and expenses using the following architect-supplied information:

- the general ledger;
- payroll records;
- statements of income and expenses;
- other information.

Balance sheets are important for the monitoring of profit margins and loan commitments as well as for financial planning. The balance sheet indicates the assets and equity position of the practice as well as all liabilities including debts. A balance sheet, and a 12-month statement of income and expenses, are sometimes required by:

- banks, for a line of credit or a loan;
- professional liability insurers;
- governments, for taxation purposes;
- other architects, when restructuring the ownership of the practice or selling the practice.

Illustration 1: Sample Statement of Income and Expenses

Revenue	Previous Year	Budget for Current Year
Professional fees	$890,000	$1,060,000
Reimbursable expenses	90,000	106,000
Interest revenue	1,000	0
Other income	0	0
TOTAL	**981,000**	**1,166,000**
Expenses		
Wages and benefits	$390,000	$466,000
Consulting fees	70,000	85,000
Management fees	70,000	90,000
Printing and reproduction	14,000	17,000
General office supplies	30,000	42,000
Rent	26,000	26,000
Temporary employment services	8,000	6,000
Insurance	28,000	33,000
Travel	20,000	22,000
Automobile expenses	25,000	25,000
Depreciation and amortization	24,000	22,000
Bad debts	26,000	20,000
Bank charges and interest	8,000	9,000
Legal and accounting fees	6,500	7,000
Telephone and facsimile	7,500	8,000
Delivery and postage charges	9,000	8,000
Photography	4,000	4,000
Architectural supplies	6,500	8,000
Business taxes	7,500	7,500
Memberships and dues	4,000	4,500
TOTAL	**784,000**	**910,000**
Revenue less expenses	**$197,000**	**$256,000**

Financial Professionals

Accountants

An accountant is a licensed professional who adheres to certain professional standards and the use of established accounting principles. An accountant should respond to the needs of the practice by advising on the type and extent of financial services required for the size and complexity of the practice.

The accountant's task will be easier, resulting in lower fees for accounting services, if the architect practises good financial management and keeps proper books of account, including:

- general ledger;
- accounts payable;
- accounts receivable;
- payroll records.

Accountants should be familiar with most software programs and be able to provide advice on the software suitable to the size and complexity of the practice. Generally, all payroll software should be for use in Canada.

When engaging an accountant, as with all professionals, it is necessary to establish a clear understanding of the following:

- the services to be provided;
- the "deliverables" or financial reports;
- the professional fee.

The architect involved in the financial aspects of the practice should develop a rapport with the accountant. Nevertheless, it is good practice to request proposals from other accounting firms every three to five years. Proposals from firms of various sizes — and from certified general accountants or certified management accountants, in addition to chartered accountants — should be considered.

Bankers

It is also important to establish a professional relationship with a banker. Proper long-range financial planning and the establishment of a capital reserve should eventually enable the architect to avoid having to finance day-to-day operations. When funds for the operation of the practice are not required, it is possible to "tender" for the bank service fees by asking two or more banks to quote on the charges for various banking services. Instead of acquiring a short-term loan to finance operating expenses, many businesses negotiate a line of credit which can be used when and as required up to a limit arranged with the bank.

The best time to negotiate for a line of credit is when financing is not required. In this case, the cost is usually reasonable in the form of a low standby fee, and the line of credit will be in place when it is required. The interest rate quoted will probably be determined by the bank's perception of the level of risk in financing the architectural practice. The interest rate charged by the bank will be expressed as the percentage over the "bank rate" or "prime rate." (The prime rate is the fluctuating rate which banks charge their best customers.)

When the practice does need to borrow funds, the architect should provide complete records of past performance, plus detailed budgets and long-range financial plans. This information assists the banker in deciding on a line of credit for the practice. The amount of credit is usually a percentage of the accounts receivable and work-in-progress. If the amount requested is high, the bank may demand a higher percentage rate of interest over "prime" on the loan, and usually requires personal guarantees from principals, directors or major shareholders.

A well-prepared cash flow projection (see Illustration 3) for the year ahead may be necessary to successfully negotiate a line of credit with the bank. An accountant can provide advice on the information required by banks for approving loans and a line of credit.

Information for Financial Management

Accurate and complete financial information can assist the architect in preparing accurate budgets, and in monitoring and controlling expenses incurred in providing architectural services. Various forms for financial management purposes are provided in Chapter 2.2, *Sample Forms for the Management of the Practice*, including the following:

- Invoice;
- Fee Calculation Sheet;
- Project Cost Control Chart;
- Time Report;
- Expense Claim Form.

Fee Calculation

When determining fees for services, the architect should identify and determine the following:

- each component of the services to be provided;
- the cost of production for each component (including direct and indirect costs);
- the profit margin to be achieved.

All projects should generate a profit. The only possible exception to this principle is when the loss is part of a long-range or short-term strategy (such as undertaking a new and unknown building type). Such a loss can be endured only if:

- the loss is clearly forecast;
- adequate reserves are available to underwrite the loss.

The various methods of compensation, or methods of fee calculation, are outlined in Chapter 2.1.10, *Architectural Services and Fees*.

Regardless of which method is selected, the architect should also estimate the amount of time needed to complete all the required tasks for the project, as well as the associated costs, by using staff "billing rates" (also called charge-out rates). This estimate can be used to check whether the proposed fee will be adequate to complete all the services to be contracted, and if a profit can be realized.

For example, when estimating the fees for schematic design, the architect should:

- calculate how many hours it will take to develop one schematic design, by whom, and at what billing rate;
- estimate the time to develop subsequent designs using the same procedure, as it may be necessary to undertake two or three schematic designs;
- define in the agreement how many different alternative schematic designs will be developed;
- quote an additional fee for each subsequent alternative beyond the number quoted.

A "Fee Calculation Sheet" is provided in Chapter 2.2, *Sample Forms for the Management of the Practice*, for this purpose.

Adequate profit margins may not be achieved if:

- additional time on the project is required due to unexpected circumstances;
- additional time is not billable as an "additional service";
- too low a fee was offered or negotiated;
- the time required to provide adequate services was incorrectly estimated;
- the project was poorly managed.

[Note: Additional time is often required when the project is a building type with which the practitioner is not familiar.]

Billing Rates

RAIC Document Six: The Canadian Standard Form of Contract Between Client and Architect defines "direct personnel expense" and provides the opportunity to invoice for services using multipliers when the fees are charged on an hourly basis.

Establishing billing rates is becoming more complex in today's competitive business environment. Billing rates must include overhead costs, including:

- office rent and operating costs;
- equipment purchasing or leasing, and maintenance;
- secretarial, clerical, and bookkeeping services.

Some large offices may have several staff positions that contribute to office overhead; their services are not chargeable directly to clients.

The salaries and benefits of each employee in the practice are known factors and can be converted to an hourly direct personnel expense by dividing the annual salary-plus-benefits (as defined in Document Six) by the number of *billable hours* in a year. One method for determining the number of billable hours in a year is to multiply regular daily hours by 365 days and deduct the following:

- weekends;
- statutory public holidays;
- an allotment of time for vacations;
- an allowance for sick leave;
- an allowance for non-productive time.

The billing rate is determined by applying a multiplier to the calculated hourly direct personnel expense. The multiplier is a factor which includes overhead plus profit, and can vary from 1.8 to 3.0 depending on the size of the practice and its location (such as an urban centre with high costs).

A rule of thumb for calculating billing rates is to add 25% to the hourly rate for payroll burden, double the total to include overhead, and add 50% of the overhead for profit. This is the equivalent of a multiplier of 3.125 applied to the direct personnel expense.

The following is an example for an employee with an hourly wage of $40. In this example, the profit is 20%.

Employee's hourly wage	$40
Payroll burden (25% of $40)	$10
Sub-total (direct personnel expense)	$50
Overhead	$50
Profit (one half of overhead)	$25
Billing Rate	**$125**

Architects that charge less than this formula limit growth and profits.

Utilization Factors

The percentage of billable hours as compared to the total hours of work in a year is called the "utilization factor."

Utilization factor is a percentage determined by dividing the actual billable hours by the total billable hours possible.

$$\% = \frac{\text{actual billable hours}}{\text{total billable hours}}$$

Utilization factors may range from:

- 50-65% for principals;
- 70-80% for senior architects;
- 80-85% for project architects and technical staff.

Some personnel, such as those involved only in marketing or management, may have no billable hours and therefore no utilization factor. Utilization factors should be monitored regularly because of the direct correlation between high utilization factors and high revenue potential.

Illustration 2 is a typical utilization analysis.

Illustration 2: Calculation of Utilization Factors

1. Calculation of Total Available Billable Hours		
1.1 Available hours:	37.5 hours x 52 weeks =	1,950 hours
1.2 Non-billable hours:		
Vacations	14 days	
Statutory holidays	8 days	
Other	4 days	
Sub-total	26 days x 7.5 hours = 195 hours	
Reduced summer hours	22 days x 2.5 hours = 55 hours	
Total non-billable hours		(250 hours)
1.3 Total Available Billable Hours		**1,700 hours**

2. Utilization Factor	A	B	C	D	A x D
Staff	**Actual Billable Hours**	**Total Available Billable Hours**	**Utilization Factor**	**Billing Rate**	**Fees Billed**
Principal	935	1,700	**55%** $\left(\frac{935}{1700}\right)$	$200/hour	$187,000
Senior Architects (2)	1,360	1,700	**80%** $\left(\frac{1360}{1700}\right)$	$125/hour	$340,000
Junior Architects (2)	1,445	1,700	**85%** $\left(\frac{1445}{1700}\right)$	$90/hour	$260,100
Architectural Technologists (5)	1,580	1,700	**93%** $\left(\frac{1580}{1700}\right)$	$75/hour	$592,500

Project Cost Control Information

Information used to control project costs helps the architect to monitor income, expenses, and profit for each segment of the work on a project. A sample form, "Project Cost Control Chart," is provided in Chapter 2.2, *Sample Forms for the Management of the Practice*. This is a very basic chart; however, many software programs are available to assist the architect in monitoring project costs.

Project cost control information should be monitored regularly to ensure that all tasks are completed within the estimated time and budget.

Time Reports

Time reports or time sheets should record sufficient information to provide summaries of time spent, on a weekly basis, for each task or portion of architectural service. The type of service and phase of the project should be accurately identified in order to measure budgeted time against actual time spent.

For example, if a fee for schematic design has been budgeted at $12,000 and if one person with an hourly wage of $40 per hour will be assigned to produce this schematic design, the practice must budget $125 per hour, which calculates out to $12,000 ÷ $125 = 96 hours. If the individual has a utilization rate of 90%,

then 90% of 37.5 hours per week = 33.75 hours of billable time. At a rate of 33.75 hours per week, it would take 96 hours ÷ 33.75 = 2.84 weeks (nearly 3 weeks) to complete the work. Reviewing the weekly time sheets in conjunction with the progress of the work will help to verify whether or not the design is advancing at approximately 33% per week.

A "Time Report" form is provided in Chapter 2.2, *Sample Forms for the Management of the Practice*.

Cash Flow Forecast

A cash flow forecast is helpful in projecting the practice's cash position over a 12-month period. Such a forecast is needed to determine how much cash will be required to meet expenses for the short term and for any additional requirements of working capital from a line of credit.

The forecast should reflect the following on a monthly basis:

- operating funds required;
- line of credit required;
- relationship between revenues and operating expenses.

Several computer software programs are available to assist in the preparation of these forecasts. In preparing a cash flow forecast, a client's payment history should be considered because many clients take longer than 30 days to pay invoices. The forecast should be monitored every month by comparing actual revenues and expenses with those forecast. The forecast should be updated quarterly. A sample cash flow forecast is shown on Illustration 3.

Invoicing

The use of the invoice form is discussed in section 2.1 of Chapter 2.2, *Sample Forms for the Management of the Practice*. Useful tips on invoicing and collecting accounts are found in Chapter 2.1.9, *Risk Management and Professional Liability*.

Other Financial Management Issues

Compensation

Ideally, compensation for all professionals in an architect's office should be similar to compensation paid in other professional practices, assuming similar levels of responsibility as well as similar time and energy expended. In reality, all staff — including senior, junior, and intern architects; technical staff; and support staff — are compensated based on market conditions. Compensation also includes comfortable working conditions and professional career opportunities and challenges.

Surveys and information on standard levels of compensation are available from:

- federal government surveys;
- surveys by professional associations;
- surveys by architectural journals;
- an exchange of information with other architectural practices.

Proper financial management and current statistics enable the architect to properly compensate staff, thereby helping to increase productivity.

Tax Planning

Accounting advice should be sought for proper tax planning. The financial management of an architectural practice must consider the following taxes:

- **Goods and Services Tax** (GST), or Harmonized Sales Tax (HST) in some provinces, must be collected on all income. The total amount collected is reduced by the amount of GST/HST paid to vendors. The difference due to the government is usually paid quarterly.
- **Employees' income tax** is deducted by the practice for every employee for every pay period. Payment is made to the federal government at intervals determined by the pay period. Income tax deductions include provincial income taxes as well as federal income taxes, CPP, and EI.
- In Québec, federal income tax and EI are paid to the federal government; provincial income tax and QPP are paid to the provincial government.

Illustration 3: Sample Cash Flow Forecast

Cash Flow Forecast													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Cash/Bank Begin Month	$12,500	$13,590	$6,700	$4,790	$5,180	$4,570	$8,660	$2,050	$(360)	$3,030	$10,920	$11,510	$15,350
Revenue													
Acme Addition	$8,500	$4,000	$4,000	$1,500	$1,500	$1,500	$1,500	$1,000	$500	$500	$500	-	$25,000
Dromme House	$4,000	$4,000	$3,000	$3,000	$3,000	$2,500	$1,500	$500	$500	$500	-	-	$22,500
St. Bergen Church	$6,500	$3,000	$2,500	$1,000	$1,000	$1,000	$500	$500	$500	$500	-	-	$17,000
Drummville School	$5,000	$2,500	$2,500	$1,500	$1,000	$500	$500	$500	-	-	-	-	$14,000
Roberts Montessori	$4,500	$3,500	$2,000	$1,000	$500	$500	$500	$500	-	-	-	-	$13,000
Glayburne Residence	$1,000	$4,000	$2,500	$1,500	$500	$500	$500	-	-	-	-	-	$10,500
Boros Cottage	$500	$3,500	$1,500	$500	-	-	-	-	-	-	-	-	$6,000
Muffler Shop	$1,000	$1,000	$2,500	$4,500	$1,500	$500	$500	-	-	-	-	-	$11,500
Spirios Restaurant	$500	$1,500	$2,500	$6,000	$2,000	$1,000	$1,000	$500	$500	$500	$500	-	$16,500
Port Hope Townhouses	-	$1,500	$2,500	$6,500	$12,000	$12,000	$3,500	$3,000	$3,000	$2,000	$1,000	$1,000	$48,000
Boros Apartment	-	-	-	$1,000	$4,500	$8,000	$7,000	$1,500	$1,500	$1,000	$1,000	$1,000	$26,500
Sub-total	$31,500	$28,500	$25,500	$28,000	$27,500	$28,000	$17,000	$8,000	$6,500	$5,000	$3,000	$2,000	$210,500
Marketing Target (potential projects)	-	-	-	-	-	$5,000	$10,000	$15,000	$20,000	$25,000	$25,000	$30,000	$130,000
Forecast Total	$44,000	$42,090	$32,200	$32,790	$32,680	$37,570	$35,660	$25,050	$26,140	$33,030	$38,920	$43,510	$355,850
Expenses													
Payroll	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$192,000
Consultants	$9,500	$7,000	$6,500	$6,000	$6,500	$8,000	$6,500	$4,500	$2,000	$1,000	$6,500	$7,500	$71,500
Rent	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$2,400	$28,800
Membership dues	-	$1,280	-	-	-	-	-	-	-	-	-	-	$1,280
Insurances	-	$6,200	-	-	-	-	$6,200	-	-	-	-	-	$12,400
Supplies	$250	$250	$250	$250	$250	$250	$250	$250	$250	$250	$250	-	$2,750
Marketing	$800	$800	$800	$800	$800	$800	$800	$800	$800	$800	$800	$800	$9,600
Reproductions	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$2,400
Furniture/Equipment	$600	$600	$600	$600	$600	$600	$600	$600	$600	$600	$600	$600	$7,200
Telephone	$160	$160	$160	$160	$160	$160	$160	$160	$160	$160	$160	$160	$1,920
Miscellaneous	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$2,400
Legal/Accounting	$300	$300	$300	$1,000	$1,000	$300	$300	$300	$500	$500	$300	$300	$5,400
Forecast — Total Expenses	$30,410	$35,390	$27,410	$27,610	$28,110	$28,910	$33,610	$25,410	$23,110	$22,110	$27,410	$28,160	$337,650
Cash/Revenues — Expenses (end of month)	**$13,590**	**$6,700**	**$4,790**	**$5,180**	**$4,570**	**$8,660**	**$2,050**	**$(360)**	**$3,030**	**$10,920**	**$11,510**	**$15,350**	**$18,200**

- **Personal income tax** is usually based on the previous year's income taxes and should be remitted in quarterly installments. An accountant may provide the architect with a schedule for remittances.
- **Provincial sales tax** (PST) is paid as supplies are purchased. Unless these supplies are sold again, PST is not collected or required to be collected by architectural practices, except in Québec where it must be collected.
- **Corporate taxes**, if the practice is incorporated, will be estimated by the accountant and should be remitted quarterly.
- **Business taxes** are charged by some municipalities for operating a business in their jurisdiction. [Note: in some municipalities, an architectural practice requires a business licence in order to provide services for a project located in that municipality, even though the practice is located elsewhere.]

[Note: the penalties for late payment are severe, and taxes should always be remitted on time.]

Definitions

Accounts Payable: A record of accounts of money payable to consultants and to other suppliers for overhead expenses.

Accounts Receivable: A record of professional fees and disbursements which have been invoiced, whether or not payment has been received.

Aging Reports: A record of invoices due and past due.

Balance Sheet: A record of all **assets** such as bank funds, receivables, furniture, computer equipment, and all **liabilities** such as accounts payable and loans, and retained earnings which state the financial position of the practice at a particular point in time.

Cash Book: A record of the day-to-day cash position of the practice using the cash accounting method. All transactions are entered and a running balance is calculated.

Cash Flow: Adequate cash and other liquid assets to meet current payroll, consultants' fees, and other overhead expenses.

Depreciation: The percentage by which capital assets may be depreciated according to government tax regulations (referred to as Capital Cost Allowance).

Direct Personnel Expense: The salary of the architect's or the architect's consultant's personnel engaged on the project plus the cost of such mandatory and customary contributions and employee benefits as employment taxes and other statutory benefits, insurance, sick leave, holidays, vacations, pensions, and similar contributions and benefits.

Disbursement Record: A record of billable reimbursable expenses.

Fiscal Period: A 12-month period for which financial records start and end. (Previously, it was an advantage for a fiscal year to end early in the calendar year. Legislation now requires most professionals to pay taxes on the basis of a calendar year, which encourages the fiscal year-end to correspond to the calendar year.)

General Ledger: A record of all accounts, including receivables, payables, income and expenses, payroll, tax payments, disbursements, etc.

Multiplier: A percentage or figure by which direct personnel expense of staff is multiplied to cover overhead expenses and profit. (The result is used to establish a change-out, or billing rate.)

Annual Budget Calculation Sheet

INCOME	Previous Year	Budget	Change
Professional fees			
Reimbursable expenses			
Interest			
Other income			
TOTAL			
EXPENSES	**Previous Year**	**Budget**	**Change**
Salaries			
Professional staff			
Technical staff			
Support staff			
Payroll burden and benefits			
Consultants' fees			
Management fees and expenses			
Legal fees			
Accounting fees			
Insurance			
Professional liability insurance			
Office insurance			
Life and disability insurance			
Other insurance			
Professional dues			
Professional development and training			
Office premises			
Rent			
Utilities			
Office maintenance and repair			

EXPENSES	Previous Year	Budget	Change
General office administrative expenses			
Printing and reproduction			
Leases for equipment			
Telephone, facsimile, electronic mail			
Office supplies			
Computer hardware, software, and maintenance			
Photography			
Postage and courier			
Taxes			
Business			
Property			
Other taxes			
Interest			
Charitable donations			
Automobile expenses			
Public relations and marketing			
Travel and entertainment			
Printing and proposal preparation			
Depreciation			
Losses and bad debts			
TOTAL			
PROFIT (income less expenses)			



2.1 Management of the Practice

2.1.5 Office Administration

Introduction

Office Policies and Procedures

Office Premises
- Maintenance
- Security
- Office Insurance

Filing and Retrieval Systems
- Filing Systems
- Retaining Files
- Archiving Project Records
- Archiving Electronic Files

The Office Library

Computer Systems
- The Internet and E-mail
- Computer Systems for Office Administration
- Computer Systems for Building Information Modeling (BIM) and CAD
- Computer Training
- Upgrading Hardware and Software

References

Checklist: Information to include in a Manual on Office Policies and Procedures

Chart: A Project Filing Format

Office Administration

Introduction

An architectural practice must be well-organized and well-managed in order to provide proper architectural services to the public and to be profitable. As well, good management decreases exposure to risk and liability. (Refer also to Chapter 2.1.9, *Risk Management and Professional Liability*.) This chapter discusses several methods for improving the administration or management of an architectural practice.

Office Policies and Procedures

It is important to establish policies and procedures which govern the day-to-day operations of the architectural practice and to ensure that all employees are familiar with them. Therefore, policies and procedures should be documented in writing, ideally in the form of an "office manual." Amendments or new information may be added from time to time. The office manual is an important tool for both large and small offices. It becomes a guide to both management and staff regarding the many aspects of managing an architectural practice.

One advantage of such a manual is that, by adhering to its policies, all staff are treated fairly and consistently. The office manual is also a valuable resource when interviewing and hiring new staff. Prospective employees are understandably interested in learning about the firm's policies on such basic issues as working hours, overtime (if applicable), vacations. With an up-to-date office manual, principals can respond to these questions confidently and in a manner that is consistent with the policies already applied to existing staff.

The office manual can also help to communicate the firm's philosophy, goals, and, possibly, "mission statement." This helps to ensure that staff are aware of the principals' underlying objectives and what is expected of staff. Some practices require all staff members to sign and date an acknowledgement attesting to the fact that they have read the office manual and agree to its terms.

At the end of this chapter, the "Checklist: Information to include in a Manual on Office Policies and Procedures" lists some of the issues to resolve and to include in an office manual.

Office Premises

The architect's office is a multi-functional operation. In addition to being the centre for the operation of the practice, it also fulfils a promotional role. The appearance of the office makes a statement about the practice's image and, to a certain extent, its degree of organization. As well, the space provides an opportunity to display examples of built projects and current designs. The first impression that visitors or prospective clients receive when they visit the office will be a lasting one. Therefore, the office should reflect the firm's philosophy by being orderly and well-organized. The premises also should support the organization and facilitate the control of all types of documentation.

The office can also be an opportunity to showcase a design that enhances the health and productivity of staff and promotes best practices in sustainable design, such as, daylighting and views; the use of "green" materials; good indoor air quality; and flexible, energy-efficient controls for ventilation and lighting.

Maintenance

The busier and more successful a practice becomes, the easier it is to ignore minor maintenance needs to the detriment of the office's professional image. One solution is to engage a reliable maintenance person — perhaps on an ongoing, as-needed basis — to address minor repairs quickly and economically. Arrange regular office cleaning to suit the size of

the firm and the level of activity in the office. Small practices may require a cleaning person once per week and may choose to have staff take on some chores. Mid-sized offices may require more frequent service, and larger offices may require cleaning every evening. Cleaning services may be part of the lease in an office building.

When engaging office maintenance firms, architects should consider the need for office security and requirements for a bonded company.

Security

An architectural practice may have two areas of concern for security:

- security of computer systems;
- external security.

Security of Computer Systems
Security for each computer station is usually accomplished by the use of password protection. One approach for a small architectural practice which is not "networked" is to provide limited password protection. Under this system, access via a password is limited to certain files or projects. Principals may wish to set up password protection for certain managerial files. Computers used for accounting or bookkeeping purposes may require separate security provisions.

For networked offices, a hierarchy of security may be required. By definition, a networked office is designed to share information — particularly drawing files — among members of the firm. Too much security could reduce efficiency. A balanced approach to security and access to information should provide both without sacrificing either.

External Security
External security refers to the need to protect the office itself from intrusion to avoid theft or vandalism. Adequate security is important to protect confidential documents and computer databases. Some offices have a fire-rated "vault" for the storage of important documents and original software. It is also common practice for principals to store copies of documents in an off-site location, such as their personal residences.

Security systems vary in their complexity and features. A minimum standard should include an electronic alarm system, connected to a siren or signal and possibly monitored by a central security office.

Control of office keys is a concern too because of staff turnover. The practice should maintain a master log to control the distribution and retrieval of all keys. Depending on the rate of staff turnover, it may be appropriate to re-key locks on a regular basis.

Office Insurance

Insurance protection is important for covering the physical assets of the architectural practice. Most commercial office insurance policies are "package" forms, meaning that certain coverages are automatically included. Some of the extensions to property insurance usually available with a commercial policy package include the following:

- office contents, such as furnishings and computer hardware, software, and data;
- accounts receivable;
- exterior signs;
- personal effects of employees;
- glass coverage;
- valuable papers;
- property off premises (that is, located in site offices, employees' homes, etc.);
- property in transit;
- newly acquired location coverage;
- crime coverage.

In addition to property coverage, the policy should include Commercial General Liability (C. G.L.) protection.

The practice should consider other insurance protection, including:

- tenants' legal liability coverage;
- non-owned automobile liability coverage;
- employer's liability protection.

If the practice is a home-based business, a "Home-run Business" endorsement may be required on the home insurance policy.

An insurance broker can discuss the operation of the practice and advise on office insurance requirements.

Refer also to Chapter 2.1.1, *Organization of an Architectural Practice*, for other types of insurance requirements.

Filing and Retrieval Systems

It is good practice to thoroughly document all project activities and communications. Documentation minimizes the potential of future conflicts and provides the basis of a solid defence in the event of a claim being made by any project participant or if the architect is faced with other legal action.

Some of the types of documentation that the architect should maintain are described in Chapter 2.2, *Sample Forms for the Management of the Practice*, and Chapter 2.4, *Sample Forms for the Management of the Project*.

This section discusses possible filing systems in an architect's office for storing and retrieving this documentation.

Filing Systems

A successful filing system provides a central location for all project documentation and, more importantly, permits easy and immediate retrieval of information. The architect should consider printing file numbers on all correspondence to identify incoming mail, facilitate routing, and, finally, coordinate with filing procedures. Refer to Chapter 2.2, *Sample Forms for the Management of the Practice*, for a sample stamp for all correspondence. Files should not be created unless there is sufficient documentation or correspondence to warrant them. If a piece of communications discusses more than one subject, it should be duplicated and placed in all the appropriate files.

An architectural practice will require at least two types of filing systems:

- filing of information relating to the management of the **practice**;
- filing of information related to the management of the **project**.

Information related to the management of the practice may include employee records, business and professional liability insurance information, and overall financial records. This information requires a special — and possibly confidential — filing system, organized to meet the needs of each practice.

It is also important to establish some form of filing system for marketing, promotional materials and communications which are generated in seeking new commissions. Referencing past proposals is important when pursuing new opportunities.

In addition, a separate file or series of files is usually established for each project, frequently filed by the project number. Key information should be at the start of the project file. Refer to Form 1.5, "Project Team Directory," in Chapter 2.4, *Sample Forms for the Management of the Project*, for a sample form.

One suggested system for filing project information is based on an architectural project's major phases:

- Pre-design;
- Design;
- Construction Documents;
- Bidding/Contract Award;
- Construction;
- Post-construction.

Within each phase, general headings can be provided which include categories for correspondence by, or to, the design or construction team members. This system provides flexibility and can be changed or expanded to suit the requirements of a particular project. Colour-coding the filing system can be used to identify file folders quickly.

The "Chart: A Project Filing Format," at the end of this chapter, suggests a possible project filing system. The Project Filing Format is intended as a guide only, and should be adapted to suit the needs of the individual architectural practice.

Retaining Files

The architect should always be aware of the potential for professional liability. Therefore, records should be maintained well beyond completion of the project. Good records help to prepare a good defence. However, maintaining extensive files for long periods may create storage problems. The architect should consider outside storage or digital storage, once the contractor's one-year guarantee/warranty has expired.

At a minimum, all project records should be retained until after expiry of the limitation period

for pursuing a claim for professional negligence. The time period contained in the statutes of limitations varies from province to province. Refer to the "Chart: Comparison of Statutes of Limitations in Each Province," in Chapter 2.1.9, *Risk Management and Professional Liability*.

Archiving Project Records

One final task often overlooked on a project is organizing records so that files will be orderly, well-labelled, up-to-date, and easily located. This is critical when information on a project is needed at a later date. Frequently, the retrieval is done by others not involved in the original project. Some firms place one copy of all final reports in the office library as reference material for future projects.

Archiving Electronic Files

It is also important to archive electronic files. The technology for storing this data is constantly changing and improving. When new software and hardware are purchased, the architect should ensure that they are compatible with the existing system used for storing electronic files.

The Office Library

In addition to a filing system, every architectural office should maintain a reference library. This library may include some of the following:

- information on building design and architectural practice;
- technical information on specific building products (product literature and samples);
- standards, codes, and other information such as statutes and regulations from Authorities Having Jurisdiction;
- information and practice bulletins from the architectural licensing authorities.

These materials should be stored in a central area, where they are easily accessible to the staff for daily use.

Product literature may be in the form of CD-ROMs, manufacturers' three-ring binders, or loose information (often gathered at trade shows or conferences, or received in the mail). Binders should be stored for easy access and identification. Some practices require a "sign-out" sheet for borrowing these binders. The common method for organizing product information is the use of the MasterFormat™ 50 division system with a number on each binder or piece of literature corresponding to the section number of the MasterFormat™ system.

Computer Systems

Architectural offices are usually very computerized. In setting up a computer system, the practice needs to determine its software requirements before purchasing hardware. Software programs and the need for networking will dictate hardware requirements. Since information technology and computer systems are critical to daily operations of an architectural practice, it is prudent to engage an in-house information technology (IT) manager or to have an IT consultant who is always on call.

The Internet and E-mail

All practices should be connected to the Internet and have the capability to receive and transmit E-mail and electronic files. E-mail can be used for the following:

- communicating with clients and consultants;
- identifying project or architectural opportunities (such as on the MERX system);
- posting bid opportunities and documents (such as CANet);
- transmitting electronic drawing files;
- marketing;
- research;
- contract administration, including transmittal of photographs and video field reviews.

Even though all architectural documents are subject to copyright, it should be noted that any electronic drawing which is posted on a "public" Internet site can easily be copied.

Computer Systems for Office Administration

Basic programs for office administration include the following:

- word processing and specification editing software;
- spreadsheet software;
- bookkeeping and accounting software (refer also to Chapter 2.1.4, *Financial Management*);

- project management software (refer also to Chapter 2.3.2, *Types of Construction Project Delivery*);
- contact software (used for marketing);
- anti-virus software;
- human resources management and payroll software.

Computer Systems for Building Information Modeling (BIM) and CAD

It is important to determine the practice's needs for design, drawing, and graphic applications as well as computer modeling (such as energy modeling, daylight modeling, rendering, etc.) and then select the appropriate software before choosing the computer hardware. Hardware must be selected based on the required speed, memory, and networking capabilities to accommodate the selected software.

A rigid schedule and protocol must be developed and adhered to for the backup of all electronic information. Because back-up tapes could be destroyed in the event of a fire or other disaster, they should be stored off-site. Refer also to Chapter 2.3.7, *Construction Documents — Drawings*.

Computer Training

If staff of an architectural practice are not adequately trained to use the available software, productivity will suffer. Formal computer training, as well as informal in-house training programs, can lead to significant improvement in performance. An annual budget for computer training should be established for this basic need.

Upgrading Hardware and Software

Computer technology requires that both hardware and software be monitored, reviewed, and upgraded when it is necessary to remain current and competitive. Software upgrades may be needed when the software companies develop new versions of their programs. Hardware upgrades are required on an ongoing basis (to provide greater speeds, better resolution, faster or different outputs, or more memory). Careful management of the inventory of computer software and hardware is an ongoing necessity of office administration.

References

Franklin, James R. *Current Practices in Small Firm Management: An Architect's Notebook*. Washington, D.C.: The American Institute of Architects Press, 1990.

The Society of Design Administration: *Handbook of Design Office Administration*. New York, NY.: John Wiley & Sons, 1999.

Stitt, Fred. *The Operating Manual for the Small Design Office*. Orinda, CA: Guidelines, 1993.

Checklist: Information to include in a Manual on Office Policies and Procedures

Firm

- ❑ History of Firm
- ❑ Background of Principals
- ❑ Mission Statement, Philosophy, Goals

Staff Engagement

- ❑ Staff Information
  - Job Descriptions, etc.
- ❑ Overtime Classification
  - Hourly Paid Employees (payment for overtime as per office policy and provincial legislation)
  - Salary Paid Employees (no payment for overtime, subject to provincial employment standards)
- ❑ Performance Review
- ❑ Work Outside Office
- ❑ Codes of Conduct
  - Discrimination
  - Sexual Harassment
- ❑ Notice of Termination

Office Hours, Work Periods, and Personal Leave

- ❑ Working Hours
- ❑ Salaries and Wages (Pay Days)
- ❑ Time Sheets
- ❑ Overtime
- ❑ Personal Time
- ❑ Bereavement Leave
- ❑ Absenteeism
- ❑ Leave of Absence / Parental Leave
- ❑ Time Off for Elections
- ❑ Vacations
- ❑ Public Holidays
  - Paid Holidays
  - Eligibility for Holidays
  - Holidays Occurring During Weekends
  - Holidays Occurring During Vacation
  - Working on Holidays
  - Alternate Days Off
  - Religious Holidays

Benefits

- ❑ Temporary Sick-leave Benefits
- ❑ Pension Benefits
- ❑ Health Insurance Benefits
  - Dental
  - Extended Care
  - Vision Care
- ❑ Professional Development
- ❑ Parking at Office
- ❑ Dues for Membership in Professional Associations
- ❑ Expenses related to the Intern Architect Program (dues, examination expenses)
- ❑ Other

Allowances and Expenses

- ❑ Automobile Allowances
- ❑ Parking
- ❑ Taxi Expenses
- ❑ Entertainment Expenses
- ❑ Travel Expenses
- ❑ Expense Reports

Filing Systems and Retrieval

- ❑ General Filing System
- ❑ Project Files
  - Master Project Number Index
  - Standardized Project Filing Format
  - Technical Files Index
  - Office Administration Files Index
- ❑ File Retrieval
- ❑ New Filing and File Return
- ❑ Financial Files
- ❑ Computer and Electronic Files
- ❑ Sample Library
- ❑ Office Library
- ❑ CAD Standards

Office Administration

- Visitor and Telephone Reception
- Opening and Closing the Office
- Access to Office / Keys or Pass Code
- Meeting Rooms, Kitchen, and Lunchroom
- Word Processing
- Printing
- Equipment (such as hard hats, safety boots)
- Requisition for Supplies / Dispensing of Supplies
- Couriers
- Telephone Messages / Personal Use of Telephone
- Internal and External Mail / Circulation of Trade Information
- Internet and E-mail
- Coffee and Refreshments
- Security Systems / Computer Passwords
- Housekeeping
- Maintenance of Equipment and Office Premises

Employee Acknowledgement

- Signed and dated acknowledgement from each staff member that they have read and agree to Office Policies and Procedures.

Chart: A Project Filing Format

1. General		
1.1 General	1.1.1	Request for Proposal (RFP) and Proposal
	1.1.2	Project Team Directory
	1.1.3	Newspaper Clippings, etc.
1.2 Client / Architect	1.2.1	Correspondence
	1.2.2	Minutes of Meetings
	1.2.3	Agreements
1.3 Construction Cost	1.3.1	Project Budget
	1.3.2	Estimates
1.4 Project Management and Control	1.4.1	Personnel
	1.4.2	Fee Calculation Sheet
	1.4.3	Project Cost Control Chart
	1.4.4	Time Reports
1.5 Project Accounts	1.5.1	Invoices
	1.5.2	Reimbursable Expenses and Expense Claim Forms
	1.5.3	Additional Services

2. Pre-design		
2.1 Client / Architect	2.1.1	Correspondence
	2.1.2	Minutes of Meetings
	2.1.3	Functional Program or Feasibility Studies
	2.1.4	Client's Consultants
2.2 Consultants	2.2.1	as required
2.3 Construction Budget	2.3.1	Construction Budget
2.4 Site Information	2.4.1	Photographs
	2.4.2	Surveys
	2.4.3	Soils or Geotechnical Reports
	2.4.4	Utilities

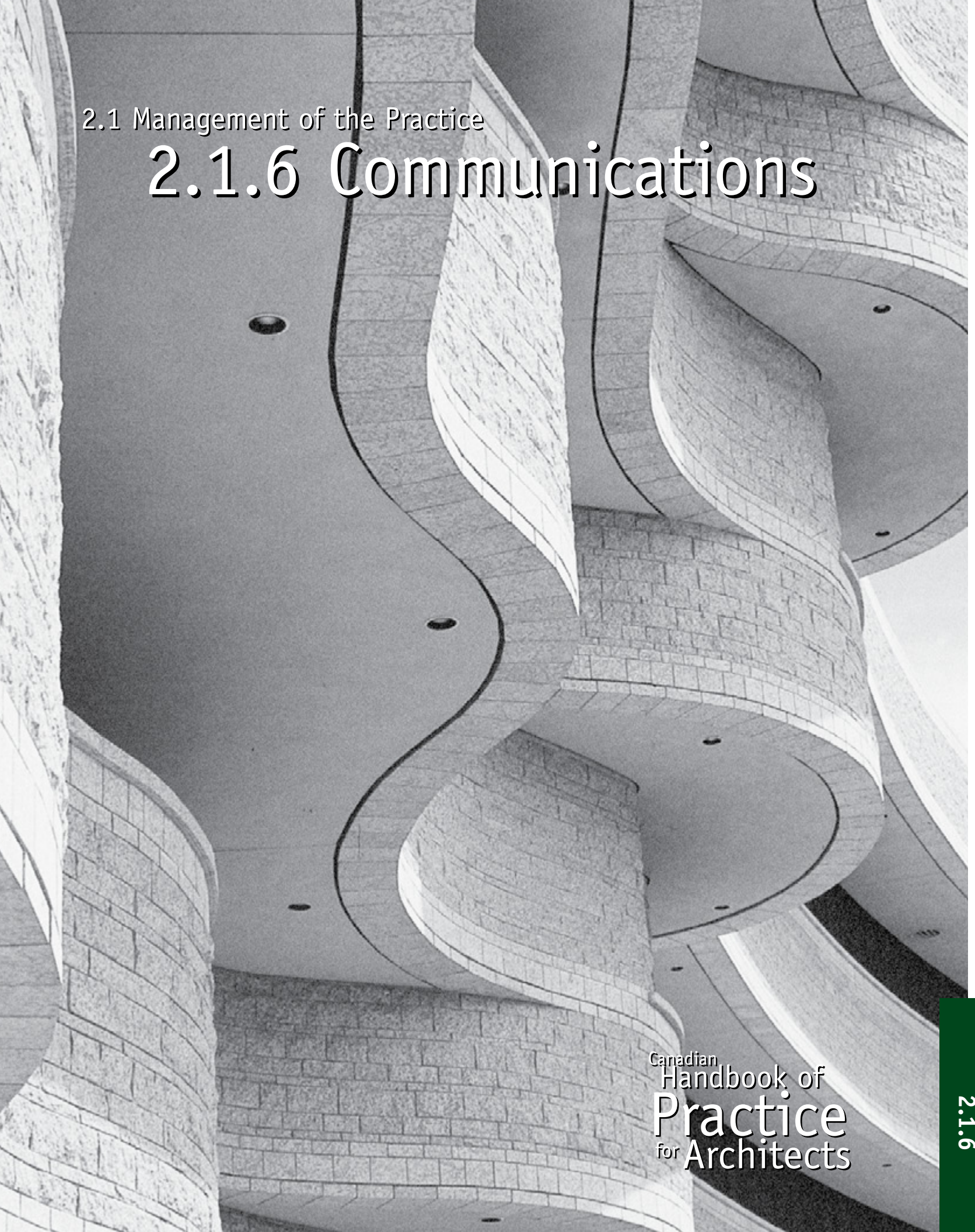
3. Design		
3.1 Client / Architect	3.1.1	Correspondence
	3.1.2	Minutes of Meetings
	3.1.3	Design Report
	3.1.4	Client's Consultants
3.2 Consultants	3.2.1	Structural Engineer
	3.2.2	Mechanical Engineer
	3.2.3	Electrical Engineer
	3.2.4	Other Consultants
	3.2.5	Minutes of Meetings
3.3 Construction Cost	3.3.1	Budget
	3.3.2	Construction Cost Estimate
3.4 Approvals	3.4.1	Municipal Authorities Having Jurisdiction
	3.4.2	Regional Authorities Having Jurisdiction
	3.4.3	Provincial Authorities Having Jurisdiction
	3.4.4	Federal or Other Authorities Having Jurisdiction

4. Construction Documents		
4.1 Client / Architect	4.1.1	Correspondence
	4.1.2	Minutes of Meetings
	4.1.3	Client's Consultants
4.2 Consultants	4.2.1	Structural Engineer
	4.2.2	Mechanical Engineer
	4.2.3	Electrical Engineer
	4.2.4	Other Consultants
	4.2.5	Minutes of Meetings
4.3 Construction Cost	4.3.1	Budget
	4.3.2	Construction Cost Estimate
4.4 Construction Documents	4.4.1	General Information
	4.4.2	Drawings
	4.4.3	Specifications
4.5 Approvals	4.5.1	Municipal Authorities Having Jurisdiction
	4.5.2	Regional Authorities Having Jurisdiction
	4.5.3	Provincial Authorities Having Jurisdiction
	4.5.4	Federal or Other Authorities Having Jurisdiction

5. Bid and Contract Award		
5.1 Client / Architect	5.1.1	Correspondence
	5.1.2	Minutes of Meetings
5.2 Consultants	5.2.1	Structural Engineer
	5.2.2	Mechanical Engineer
	5.2.3	Electrical Engineer
	5.2.4	Other Consultants
5.3 Construction Cost	5.3.1	Final Estimate
5.4 Bid Documents and Addenda	5.4.1	Bid Documents
	5.4.2	Addenda
5.5 Bidders	5.5.1	Invitation to Bid and Advertisements
	5.5.2	Pre-qualifications
	5.5.3	Deposits and Records
	5.5.4	Bid Depository
5.6 Bids	5.6.1	Bid Forms
	5.6.2	Bonds and Bid Security
	5.6.3	Analysis of Bids
	5.6.4	Alternatives and Substitutions
5.7 Contract	5.7.1	Contract Documents
	5.7.2	Bonds
	5.7.3	Insurance

6. Construction		
6.1 Client / Architect	6.1.1	Correspondence
	6.1.2	Minutes of Meetings
6.2 Consultants	6.2.1	Structural Engineer
	6.2.2	Mechanical Engineer
	6.2.3	Electrical Engineer
	6.2.4	Other Consultants
6.3 Construction Cost	6.3.1	Schedule of Values and Applications for Payment
	6.3.2	Certificates for Payment
	6.3.3	Substantial Performance
	6.3.4	Certificates for Release of Holdback and Final Payment
6.4 Supplemental Instructions and Change Orders	6.4.1	Supplemental Instructions
	6.4.2	Proposed Changes
	6.4.3	Change Orders
	6.4.4	Change Directives
6.5 Contractors	6.5.1	Correspondence
	6.5.2	Minutes of Meetings
6.6 Submittals	6.6.1	Time Schedules
	6.6.2	Shop Drawings
	6.6.3	Samples
	6.6.4	Deficiency Lists
	6.6.5	Maintenance and Operating Manuals
	6.6.6	As-Built and Record Drawings
6.7 Field Review	6.7.1	Field Review Reports
	6.7.2	Inspection and Testing Reports
	6.7.3	Photographs and Other Records
6.8 Authorities Having Jurisdiction	6.8.1	Correspondence
	6.8.2	Minutes of Meetings

7. Post-construction		
7.1 Client / Architect	7.1.1	Correspondence
	7.1.2	Minutes of Meetings
7.2 Consultants	7.2.1	as required
7.3 Construction Cost	7.3.1	Cost Analysis
7.4 Contractors	7.4.1	Correspondence
	7.4.2	Minutes of Meetings
7.5 Deficiencies	7.5.1	Warranty Inspections and Defective Work
7.6 Project Records	7.6.1	Occupancy Permits and Other Certificates
	7.6.2	Warranties and Maintenance Bonds



2.1 Management of the Practice

2.1.6 Communications

Canadian Handbook of Practice for Architects

Introduction

Three Types of Communication
- Writing
- Listening
- Speaking

Negotiating Techniques

External Communications
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- Consultants
- Contractors

Internal Communications
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- Staff

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Communications

Introduction

"Communication is at the center of architecture practice. An exceptionally gifted designer may not achieve success if he or she is unable to effectively communicate ideas to others. The construction process requires collaboration between many people, and architects must be able to communicate in a clear, concise manner for a project to be successful."
- David Greusel, AIA

The spoken word is as ephemeral as the breath with which it is spoken. The written word may last thousands of years.

These two facts demonstrate the importance of effective communications and good documentation.

The value of the spoken word should never be underestimated; in fact, impassioned speeches and great architectural presentations have inspired people to take action that has created monuments and changed the course of history. Nevertheless, the practising architect should rigorously follow two rules: "*say what you mean*"; and "*put it in writing*."

The practice of architecture always requires good communications. Some of the many situations in which communications play a key role include:

- confirming a client's functional program or statement of requirements;
- explaining a design concept to the technologist who will draw it;
- advocating approval for a zoning change to a public body or authority;
- resolving a problem on a construction site.

This chapter will discuss the principles of good communication and describe some of the procedures to improve communications in an architectural practice.

Three Types of Communication

Architects traditionally communicated through drawings. As technology develops and evolves, it is now critical for architects to adopt and integrate many different forms of communication and information technologies, including the internet, video, audio and presentation software. Traditional ways of communicating are:

- writing;
- listening;
- speaking.

Writing

Written communication distributed on paper can easily be monitored and controlled. However, it should be noted that electronic communication can be saved for years and may also be unknowingly delivered to thousands of people.

Maintaining accurate written records of all professional and business dealings, for both the management of the practice and the management of all projects, is important. Clear, written, and complete records can be invaluable in resolving disputes and are the best defence against legal action; every record will receive detailed scrutiny by lawyers of both parties in the event of a lawsuit.

Furthermore, excellent written skills are essential in most practices, not only for services where writing is paramount, such as studies and reports, but also for marketing and presentations.

All documents, both incoming and outgoing, as well as internal memos, should be dated and carry the name of the project. The date on correspondence creates an accurate chronology of events over the course of a project, such as the order in which design sketches were created or the timeliness of supplemental instructions.

This chronology of events may have to be recreated years after everyone involved on a project has left the practice (and perhaps the city or province or country) or may be deceased.

Listening

In verbal communications "active listening" is necessary for understanding the requirements of a problem and the services required.

Active listening includes:

- *observing*, by watching and paying attention to a client's actions, thoughts, feelings, and intentions;
- *amplifying*, by asking for more information;
- *reflecting*, by restating or paraphrasing the client's comments;
- *clarifying*, by seeking further elaboration and understanding of a comment;
- *interpreting*, by offering a conclusion to a remark;
- *summarizing*, by recapitulating the main issues discussed.

Developing skills in "active listening" not only improves an architect's services but can also increase a client's respect for the architect.

Disputes within the construction industry (in fact, most disputes in general) are usually the result of misunderstanding. Developing and maintaining an appropriate attitude to listening and understanding can help to identify critically important project requirements and avoid conflicts.

Speaking

Most architects are aware that a message is conveyed by more than the words being spoken. Communication also includes the tone of voice and body language. Conveying one's message requires a constant awareness of all these different communication methods, and a willingness to hone and practise presentation and communication skills.

Some tips for effective speaking and presentations include:

- assess the setting:
  - where you will stand;
  - where visual materials will be situated;
  - what options are available for lighting;
  - what your relationship will be with the audience;
- use simple, non-technical language;
- speak loudly and enunciate clearly;
- rehearse using a video;
- exaggerate gestures;
- maintain good posture;
- establish eye contact;
- eliminate "blather" (expressions such as "actually," "umm," "like");
- pause frequently.

Negotiating Techniques

For an architect, negotiating is an essential part of communications. Architects, especially principals, need to understand basic negotiating techniques which are useful in reaching satisfactory agreements with:

- clients;
- contractors;
- consultants;
- staff;
- suppliers and others.

There are many "how-to" books and media materials on negotiation techniques, and it is recommended that all principals learn as much as possible about negotiations. The advice of most of these books is to strive for a "win-win" resolution — a reasonable and fair exchange where both parties are better off than they would be without an agreement.

In every negotiation, there are three critical factors:

- time;
- power;
- information.

It is important to remember that price is not always the most important issue and that different people want different things. Negotiations should never be narrowed down to just one issue.

Many claim that physical factors, such as seating arrangements and body language, are significant communication elements when negotiating. It is important to learn and understand negotiating tactics. Refer to the publication *Mastering the Business of Design* (in Ontario, titled *Mastering*

the Business of Architecture) for an explanation of these tactics.
It has been claimed: "Be patient, be personal, be informed — and you can bargain successfully for anything."

Successful negotiations usually conclude with the following characteristics:

- both sides feel a sense of accomplishment;
- both sides feel that the other side cared and was fair;
- each side would deal with the other side again;
- each side feels that the other side will keep the bargain.

External Communications

External communications means communication with those people *outside* the architectural practice. In all communications involving the architectural practice, the architect must:

- be professional;
- be courteous;
- learn to listen;
- respect the confidentiality of clients and the practice.

For forms dealing with external communications, refer to Chapter 2.4, *Sample Forms for the Management of the Project*. It contains the following forms:

- Memorandum;
- Minutes of Meeting;
- Transmittal;
- Project Team Directory.

Clients

The architect's role is to enable the client to make informed decisions; therefore, developing a one-to-one relationship with the individual client or client group is important. The keys to building and maintaining a good relationship with any client include:

- promote "active listening" (see above);
- use simple, straightforward language in all communications;
- be honest, which includes:
  - endeavouring to facilitate the resolution of problems;
  - being willing to admit to not knowing an answer, but promising to find the answer;
- propose solutions rather than problems;
- empathize with the client (for example, do not expect a client to understand graphic images easily; architects are trained to read drawings but clients may not be);
- document thoroughly all decisions relating to a project and confirm their accuracy;
- recognize the client's right and responsibility to make major decisions regarding a project.

The greater the rapport between architect and client, the more easily the relationship will weather any contentious issues which may arise during design and construction.

Refer also to Chapter 1.2.2, *The Client*.

Consultants

Consultants are the architect's teammates on a construction project, whether they are engaged by the architect or retained directly by the client. The goal of the design team is to provide the client with a building project that satisfies the client's needs.

In communicating with consultants, the architect must:

- ensure that consultants are kept current and fully informed about a project's development;
- ensure consultants have incorporated changes, additions, or deletions to project documents;
- document all decisions relating to a project thoroughly and confirm their accuracy;
- understand all recommendations made by consultants.

Refer also to Chapter 1.2.3, *Consultants*.

Contractors

The primary means of communication with the contractor is through the construction documents. When preparing the construction documents, the architect must always remember that they are a communication tool and view them from the standpoint of the contractor. Ensure that the construction documents respond to the following questions:

- Is information easy to find?
- Is information clearly presented?

- Is the material cross-referenced to ensure completeness and clarity of design intent?
- Are unusual conditions and construction details identified and described?

Clearly written bid documents should result in:

- more accurate bids;
- fewer requirements for addenda during the bidding process;
- a smaller spread between high and low bids;
- better understanding of the design intent by the builder and trades;
- fewer delays on the construction site;
- a lower final cost to the building owner;
- a better building.

Regardless of how carefully construction documents are prepared, issues requiring additional communication by the architect will arise.

Communication during construction requires maintaining a proper balance between the need for a speedy response and careful consideration of the instruction or change. The following tips help to maintain good communications with a contractor:

- review the contract and construction documents before answering any questions;
- outline clearly the information or supplemental instructions needed by the contractor;
- confirm all verbal communications promptly in writing, using one of the following:
  - minutes of meetings;
  - Supplemental Instructions;
  - Change Orders;
  - Change Directives;
  - correspondence;
  - field review reports;
- make a note of **every** telephone call with the contractor for the project files.

Refer also to Chapter 2.3.11, *Contract Administration — Field Functions*.

Internal Communications

Internal communications refers to communications *within* an architectural practice.

Principals

Good communications between principals is essential to a healthy practice. Because partnerships usually involve individuals with complementary strengths, the principals are likely to have different ways of viewing the same set of issues and circumstances. This makes good communication even more important.

Marty Grothe and Peter Wylie give useful advice on the meaning of effective communication among principals, in a 1982 article in *Professional Services Management Journal*:

> *Accepting your partners as having a right to be different from you and not trying to make them be more like you;*
> *Being willing to sit down periodically and talk openly about your relationship with each other;*
> *Being able to listen to the other person's point of view, especially when it's different from your own thoughts and feelings, especially when there are problems;*
> *Taking responsibility for the contribution you're making to problems in the relationship, rather than blaming it all on the others;*
> *Being willing to look for solutions to problems that everyone can live with rather than trying to have it all your own way.*

Staff

The staff of an architectural practice is its most valuable resource. Staff members represent the practice through their communications with clients, contractors, and the public. Good communications skills on the part of staff members depend to a certain extent on the culture and goals of the practice.

The following tips help build good communications skills:

- insist on good communications and be a role model;
- communicate regularly with "crits" and reviews;
- communicate openly about issues facing the firm;

- seek out and listen to staff's concerns, and act on valid points;
- be clear and direct in performance evaluations;
- use memos rarely, and only to announce general information.
-

Refer to Chapter 2.1.7, *Human Resources*.

Communication Methods

The following section briefly describes various types of communication.

Meetings

A face-to-face meeting is often an effective way to resolve an issue. Planning and organization are essential for all effective meetings.

Refer to "Checklist: Planning a Meeting" at the end of this chapter.

The following steps help to ensure a "well-run" meeting:

- circulate the agenda and background information ahead of time, if possible;
- state the meeting's purpose;
- begin on time, do not wait for latecomers, and, if appropriate, do not "recap" the past discussion when they arrive;
- stick to the agenda and set time limits for each item;
- keep minutes that record the following:
  - new information;
  - decisions made (not the discussion);
  - further action required, by whom and when;
- defer items that require more in-depth discussion;
- defer items requiring further information, and assign someone to follow up with the research.

A form, "Minutes of Meeting," is available in Chapter 2.4, *Sample Forms for the Management of the Project*.

Telephone Conference Calls

Teleconferencing permits people working in different locations to conduct telephone "meetings" without the cost and time associated with travel and reduces environmental impact Although the benefits of face-to-face and non-verbal communication are lost, teleconferencing is a quick way to exchange views, to poll a group when a vote is required, or to gain consensus for a decision.

The following tips help ensure effective teleconference calls:

- arrange the meeting well in advance to ensure that all parties are available;
- verify time zones of the participants;
- assign a chairperson for the teleconference;
- provide an agenda ahead of time;
- distribute the minutes of the meeting as soon as possible after the meeting.

Electronic Media

Electronic mail (E-mail), company-wide intranet, the Internet, and local area networks (LANs) are the most prevalent methods of communication in architectural practices. It is important that the firm keep a permanent record of e-mail communications for each project. Misused, e-mail can expose an architectural practice to greater liability.

E-mail has its own etiquette and it is more than a "conversational" tool. Before sending an email consider whether or not the message would be appropriate on company letterhead and mailed to a client. It is important that all architectural practices develop policies and procedures for this form of communication because e-mail is not only written documentation but also it represents the firm.

Project-specific Web sites that can be accessed by consultants, contractors, and clients are very typical and become a comprehensive source of project information and a project management tool. All project documentation, as well as site photographs and construction videos, can be viewed on these Web sites.

Transfer of Electronic Files

Design and construction documents are usually transferred electronically often using a specific URL (uniform resource locator) such as a website or FTP site (file transfer protocol). Bid documents may also be distributed electronically without printing any sets of documents.

Contractors can use the electronic files as a basis for quantity take-offs. Many municipalities and construction associations accept electronic submission of documents. Building permit applications are also being processed electronically through various departments within a municipality. Municipalities claim that this improves the ability of information transfer and reduces the time required to process applications. Furthermore, documents can be transferred directly to the construction site. However, a number of issues must still be addressed, such as:

- enforcement of the copyright (electronic documents are very easy to copy);
- increased professional liabilities resulting from undetectable alterations to the electronic documents;
- the application of professional seals and signatures;
- the assurance that electronic files will be readable in the future.
- [Note: although it is widely believed that electronic media deteriorates over time, no one knows for certain the rate or nature of possible deterioration.]

Video Conferencing

Video conferencing provides the benefit of visual communication to participants in distant locations thereby eliminating the need for travel. It can be useful for conferences and professional development, architectural presentations, interviewing or training.

Voice Mail and Texting

Voice mail and texting — systems for leaving (and retrieving) messages — can be an effective communication tool. The following tips for voice mail are helpful:

- speak clearly and slowly, and repeat telephone numbers;
- include enough detail to enable the recipient to provide requested information on the originator's voice mail (this helps to reduce "telephone tag");
- keep messages factual and professional (messages can be archived and used as legal evidence in a dispute);
- advise when and where you can be reached (such as cellular phone, home, another office).

Courier

A courier can deliver material, such as documents on paper, in as short a time as it takes to travel from an architect's office to the final destination. As with other forms of communication, planning saves money — the less urgent the delivery, the lower the costs.

Architects normally use couriers when material such as proposals, contracts, legal instructions or other objects must reach their destination by a specific time. It is important to verify that the courier will guarantee delivery and carries insurance to cover lost items.

Facsimiles

Written communication can be sent via facsimile (fax). Exceptions to this form of communication include:

- legal documents requiring original signatures;
- lengthy documents, which are more appropriately mailed, sent by courier, or transmitted electronically;
- confidential information.

The volume of paper can be reduced by omitting the fax cover sheet for letters which are already addressed to the recipient.

Mail

Although slower than courier services, the basic service provided by Canada Post still has the distinct advantage of being the most economical way to send material from one location to another. Not everything is urgent and, with careful planning, fewer couriers may be required. Confidential material may be sent by mail and can be registered if necessary.

Desk Diary or Personal Digital Assistant (PDA)

The architect's PDA or desk diary can be a valuable communication tool both for the architect and for office staff. The purpose of these tools are to:

- schedule, at least tentatively, appointments and meetings which require the architect's attendance;
- record every appointment, phone call, and significant event in the day;
- remind the architect of past and pending appointments;

- assist staff and others in contacting the architect in an emergency.

It is important that information that should be recorded in project files does not reside only in personal "diaries" where it would not be accessible by others in the future.

Many architect also use computer software such as the Calendar in Microsoft Outlook.

Forms for Communication

Standard forms are essential for managing communications and the necessary of documentation required in an architectural practice. Chapter 2.4, *Standard Forms for the Management of the Project,* provides the following forms for General Communications (together with their purpose and the information to be included in the forms):

- Memorandum;
- Minutes of Meeting;
- Transmittal;
- Project Team Directory.

Definitions

Communication: The science and practice of transmitting information; the act of imparting news; information given; social dealings.

Minutes: The record or notes of a meeting or transaction; a brief summary of the proceedings of a meeting; an official memorandum authorizing or recommending a course of action.

References

Alessandra, Tony. *The Dynamics of Effective Listening* (audiocassette). Niles, IL: Nightengale-Conant Corporation, 1994.

Angell, David. *The Elements of E-mail Style*. Don Mills, Ont.: Addison-Wesley Publishing, 1994.

Stone, David A.
Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives, Inc., 1999.

Checklist: Planning a Meeting

When planning a meeting, consider the following checklist:

1. Planning

- ❑ Establish a need for the meeting.
- ❑ Define the problem(s).
- ❑ Research the facts and issues.
- ❑ Establish objectives for the meeting.
- ❑ Determine the most suitable type of meeting.
- ❑ Outline meeting expectations and accomplishments.
- ❑ Consider leadership (identify a chairperson and a discussion leader for each item).
- ❑ Develop and distribute a preliminary agenda.
- ❑ Determine who should attend, and why.
- ❑ Determine the pre-meeting information needed by each participant as well as the data each participant is required to bring to the meeting.
- ❑ Allow sufficient preparation time for research and preparation of each agenda item.

2. Organizing

- ❑ Prepare and distribute a final agenda, identifying who is responsible for each topic or item.
- ❑ Prepare and distribute background information.
- ❑ Discuss with the chairperson the style of the meeting and the chairperson's role.
- ❑ Determine the format of the minutes, including a report system regarding achievement.
- ❑ Consider a dry-run — if necessary, make appropriate changes.
- ❑ Determine the criteria for agreement on contentious issues.
- ❑ Consider the contributions required from the participants.
- ❑ Identify a convenient time and location, and confirm this with participants.
- ❑ Become familiar with the actual meeting place and surroundings.
- ❑ Prepare meeting material and organize logistics (audio-visual aids, reports, handouts, coffee).
- ❑ Determine who will be the recording secretary; define this person's role; obtain agreement as to expectations and timing.

3. Role of the Chair in Facilitating the Meeting

- ❑ Introduce the participants and their roles, and the meeting's objective.
- ❑ State the problems and criteria for agreement (agenda).
- ❑ Establish the guidelines for solutions.
- ❑ Ensure all possible solutions are reviewed.
- ❑ Keep on the subject, periodically restate the meeting's objectives, and continually monitor the time.
- ❑ Summarize problems and agreements.
- ❑ Encourage inter-group communications.
- ❑ Restate objectives and conclusions, and obtain agreement.
- ❑ Resolve problems or conflicts.
- ❑ Decide on a course of action, i.e., implementation of conclusions or decisions.

4. Minutes

- ❑ Develop a format for minutes.
- ❑ Establish a method for distributing minutes.
- ❑ Determine the recipients of minutes (in addition to attendees).
- ❑ Distribute the minutes as soon as practical after the meeting.

2.1 Management of the Practice

2.1.7 Human Resources



Canadian Handbook of Practice for Architects

2.1.7

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Human Resources

Introduction

The most valuable resource of an architectural practice is its people: principals and staff. Over the years, the science of human resource management has evolved and generated various theories about the factors that motivate people to be productive. Current theories suggest that self-fulfillment, is the sole motivating factor.

Vital to every organization, especially an architectural practice, is the collective personality or "culture," that emerges from the combined talent pool. The mix of individuals in a firm is as important as the individual strengths of each member in determining the future of the practice. Therefore, to help shape its culture, a firm needs proper screening and evaluation procedures for selecting employees.

The principals of the practice should develop and agree on the culture and values of their firm in a strategic plan. Refer to Chapter 2.1.1, *Organization of an Architectural Practice*, for the contents of a strategic plan.

This chapter will discuss human resources issues within an architectural practice.

Recruiting Staff

When the principals of a practice require additional skills or help, they must determine whether to hire new employees or to retain consultants to fill the gap. Projected cash flow or billings for both the short and intermediate term must be considered in order to determine the extent of staffing the firm can support. All the alternatives should be reviewed. The principals must consider the following costs:

- base cost of salaries, and costs to cover statutory employer contributions such as Canada/Québec Pension Plans (CPP/QPP), Employment Insurance (EI), workers compensation premiums, vacation pay, health tax, other benefits offered by the practice, and profit.[Note: an accountant will be familiar with the specific requirements];
- indirect costs to provide management, direction, and professional development for employees.

Refer also to Chapter 2.1.10, *Architectural Services and Fees*.

The three possibilities for meeting human resources needs are:

- independent contractors (sometimes incorrectly termed "contract workers" or "contract employees");
- temporary employees;
- permanent employees (full-time and part-time).

The architect should consult relevant information from the Canadian Revenue Agency as well as the provincial labour laws to fully understand the implications associated with each of the three options noted above. If necessary, the architect should obtain legal advice.

Independent Contractors

Independent contractors are similar to consultants and are normally retained on a short-term, per-project basis. They may be supplied by another firm or agency, or contracted directly. They are usually paid a stipulated hourly rate or fixed fee, with no deductions for income tax, Canada/Québec Pension Plans (CPP/QPP), or Employment Insurance (EI), and they receive no vacation pay. Because independent contractors are responsible for their own contributions, they are usually paid a higher hourly rate than a permanent employee or they are engaged on a fixed fee basis for specified tasks or a specific time frame.

The terms of engagement should always be confirmed in writing prior to the commencement of work, and payment should be made only after the contractor submits an invoice. The terms of engagement should also include issues such as:

- confidentiality;
- copyright;
- credit for authorship;
- use of documents in portfolios, etc.

Hiring an independent contractor, or "out-sourcing," is a common technique for determining project costs and limiting payroll responsibilities. The architect should ensure that the work is suitable, such as task-oriented work where a specific product (such as a certain number of drawings) or service is known. The actual work may occur within the architect's office but with *minimal* supervision by the architect. According to Canada Revenue Agency regulations, work by independent contractors is *not* a legally acceptable substitute for most employment situations.

Temporary Employees

Temporary employees often hired for a fixed period of time, determined prior to the commencement of work. Generally, temporary staff work under identical terms and conditions as permanent employees, except that certain benefits offered to permanent employees may not apply to temporary employees. In addition, less investment is required for professional development.

Typically, temporary employees fill staffing voids created by short-term absences of permanent employees. However, they may also "fill in" during short-term peaks in workload to avoid burdening permanent staff with overtime work. The morale of permanent employees is improved by retaining a core staff and augmenting them with temporary help. Temporary clerical or professional staff may provide efficiencies by performing tasks not requiring the skills of senior people. This frees up senior people to concentrate on more valuable activities.

Temporary employees can also compensate for gaps in the skills of existing staff — for example, a retired or other specialized professional can provide additional expertise for a specific project.

Permanent Employees

Permanent employees are vital to the long-term health and stability of an architectural practice. An appropriate mix of professional staff, technologists and technicians, and support or administrative personnel is necessary to realize both the business objectives and mission of the firm. Some practices, with a focus on design, hire architects and intern architects exclusively, augmented only by support staff. Other firms, with a focus on service, rely heavily on senior technical staff to manage and deliver projects. When engaging new employees, it is advisable for the architect to determine if their personal objectives and ambitions will mesh with the requirements and culture of the practice.

Recruiting

When hiring new staff, the architect may wish to develop an appropriate job description, seek qualified candidates, and conduct interviews. Forms contained in Chapter 2.2, *Sample Forms for the Management of the Practice*, can assist in the hiring process. These forms are:

- Typical Job Description;
- Interview Evaluation Form;
- Employment Agreement.

Employment Agreements

An offer of employment is a contract with legal implications. Often a verbal offer is accepted during an interview. To avoid misunderstandings, verbal offers should be confirmed **in writing**, stating all the terms of engagement. Refer to the "Checklist: Issues for Consideration in an Employment Agreement" at the end of this chapter. In addition, a sample "Employment Agreement" and a detailed guide for its use is contained in Chapter 2.2, *Sample Forms for the Management of the Practice*.

Managing Human Resources

Managing professionals presents unique challenges, because professionals are usually career-oriented and strive for upward mobility.

Office Conduct

The success of any architectural practice depends on the conduct, manners, and performance of staff or the "team." All staff in an architectural practice expect and deserve professional treatment. Consultants, peers, and employees should all be treated with the same respect and courtesy.

When working in stressful, "deadline-oriented" environments, architects can sometimes become impatient. Architects must realize that the urgency "to get the job done" has to be balanced with the cost of damaging goodwill. Principals and staff who are confrontational lose the respect and cooperation of their colleagues.

Valuable time and effort is lost when alienated employees leave a practice. It has been stated that architectural practices spend approximately 25% of a lost worker's salary in recruiting and training a replacement. An architect's time is more effective when spent on strategic activities for the practice rather than hiring and training new staff.

Standard office policies and procedures for conduct should be established and included in an "office manual." Refer to Chapter 2.1.5, *Office Administration*, for information to include in the manual.

Statutory Benefits

The architect is required by law to provide employees with the following benefits:

- **Employment Insurance (EI)** — EI is calculated on the basis of each employee's insurable earnings. The employer contributes 140% of the amount (or 1.4 x) that the employee contributes. When an employee stops working, a Record of Employment (Form INS 2106) must be filed with Canadian Revenue Agency. Depending on the number of weeks of work and the salary level, benefits are payable by the Government of Canada.
- **Canada Pension Plan (CPP)/Québec Pension Plan (QPP)** — CPP/QPP is calculated on the basis of pensionable earnings. The employer and employee contribute equally. Benefits are generally not payable until after the age of 60 to 65 and relate to an employee's total lifetime earnings.
- **Workers Compensation or Workplace Safety Insurance Board** — The payment of premiums is required. (Refer also to Chapter 1.2.1, *The Construction Industry*.)
- **Vacation Pay** — Employee vacation pay varies from province to province. The amount is usually three weeks per year, but it is two weeks in some jurisdictions. Check with provincial labour legislation. Vacation pay or vacation period is frequently increased at certain intervals at the discretion of employers. Vacation pay is accrued on the basis of a pay period and becomes payable when an employee leaves the practice.
- **Overtime** — In some jurisdictions employees paid on a salary basis are generally not required to be paid for overtime. Employers should establish employment agreements and office policies for overtime after conferring with provincial employment regulations and standards. Workers paid hourly are often required to be paid overtime, usually at a rate of time-and-a-half following a specific number of hours per week. **The length of the standard work day and work week determines when and if overtime must be paid, and this varies from jurisdiction to jurisdiction, as do overtime rates for holidays.**

When not paid out as it accrues, overtime compensation can create significant financial liabilities and should be carefully monitored.

Time Off

Time off for sick time, religious days, personal time, bereavement, etc., is at the discretion of the employer. To clarify the issue and to prevent abuse, principals should establish an office policy which states the circumstances in which paid time or unpaid leave may be taken. Some firms set a limit for the number of days that may be taken in a year. Excessive use of time off by staff warrants investigation.

Other Benefits

In addition to statutory benefits, some firms offer other benefits such as:

- extended health care;
- life insurance;
- pension plans;
- disability insurance;
- dental and vision care plans.

These benefits are usually provided on the basis of shared contributions by the employer and the employee. Insurance programs and pension plans vary. As these also have tax planning implications, the architect may wish to seek professional advice before offering them.

Incentive programs are a management tool to reward productive employees. Many firms offer bonuses, but only in profitable years. Some practices use profit-sharing or share ownership to distribute profits. Others believe that staff should be rewarded through higher salaries, and that bonuses or profit-sharing become institutionalized and eventually lose their incentive value.

Other benefits may include:

- coffee and beverages (at the office);
- use of company vehicles;
- social events;
- registration and attendance at professional development activities, such as conferences and courses.

Work from Home

Some practices allow employees to perform part or all of their work from home, through E-mail or other forms of electronic communication. Supervising work prepared off site may be difficult. The burden of coordination and checking is sometimes more onerous, and mistakes can easily be overlooked. Furthermore, the architect must determine whether the off-site work can be under the "care and control" or "direct supervision" (also called "responsible control") of the registered member in order to apply the architect's seal, as required under certain provincial or territorial Architects Acts. Refer to the chart, "Comparison of Provincial Requirements/Guidelines regarding the Application of Seals," in Chapter 1.1.4, *The Organization of the Profession in Canada*.

Harassment

Harassment includes any unwanted physical or verbal conduct that offends or humiliates. It can foster a negative work environment which interferes with job performance and productivity. Employers are liable under the *Canadian Human Rights Act* for harassment occurring on the job, whether or not management is a direct participant. Harassment will be considered to have taken place if a reasonable person ought to have known that the behaviour was unwelcome.

Harassment includes:

- threats, intimidation or verbal abuse;
- unwelcome remarks or jokes about subjects such as race, religion, disability, sexual orientation or age;
- displaying racist, sexist or other offensive pictures or posters;
- sexually suggestive remarks or gestures;
- unnecessary physical contact such as touching, patting, pinching or punching;
- physical assault, including sexual assault.

As an employer, the architect's duty is to:

- make it clear that harassment will not be tolerated;
- establish a policy dealing with harassment;
- make sure that all employers (principals and directors) and every employee understand the policy and procedures for dealing with harassment;
- inform supervisors and managers of their responsibility to provide a harassment-free environment;
- investigate and take corrective action as soon as a harassment incident occurs, even if a formal complaint has not been received.

Discrimination

Discrimination takes place when one person does not have equal opportunities because of race, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, age, record of offences, marital status, family status, or handicap. As an employer and professional, the architect's duty is to ensure that discrimination is neither practised nor tolerated within the architectural practice.

Motivation and Job Satisfaction

Motivation is a result of personal success and the organization's success. Most studies indicate that money, although important, is not always a primary factor in motivating professionals. Motivation requires the hands-on support of a "coach" who makes time to pay **individual** attention to each staff member.

Motivation works in spirals: success breeds success, whereas failure can likewise feed on itself and become systemic. To break out of a motivational crisis, principals must examine all human resource management systems, including:

- recruiting;
- work assignments;
- performance evaluation and feedback;
- promotion.

The workplace environment sets the tone for motivating professionals. Flexible work situations allow employees to schedule work on their own terms. Clear work instructions permit staff to work independently. This autonomy not only builds independence, but also aids in developing skills and provides more time for management to focus on other activities. However, work performed independently often requires affirmation or correction. The architect might consider formal design "crits" or reviews for each project so that employees can learn from each other.

Employees should be involved in making decisions regarding the delivery of services. Their opinions and talents should be used to find ways for more effective recruitment, project management and quality control.

Design is a significant part of an architect's training; thus, involvement and connection with design activities is frequently a major determinant in job satisfaction.

Not all duties in the practice can be design-related, but all work must be purposeful. Sometimes, inexperienced employees are assigned mundane tasks. However, everyone wants to contribute in a meaningful way to the work and to the world at large. In an architectural practice, **all** work is valuable; pejorative or apologetic attitudes about certain assignments should never be projected. When unskilled tasks are indeed required, the architect should offer opportunities for more challenging work on upcoming projects, and this promise should be fulfilled.

The following are some tips to help nurture staff at various stages of their career development:

Students and Intern Architects Principals should:

- assign a senior person to be an advisor or mentor to each student or intern architect;
- determine what skills are lacking or which tasks (experience requirements) need to be completed;
- develop generalist skills among students and intern architects at this stage of their careers;
- use this opportunity to recruit the best graduates.

Newly Registered Architects and Technologists Principals should:

- allow architectural technologists and newly registered architects to work independently with minimum direction;
- foster close working relationships between other staff and newly registered architects and technologists;
- nurture young staff and help them find a professional niche;
- ensure their career objectives are being met;
- consider investing the time required to make each individual a specialist to the extent that it is affordable.

Senior Professionals Principals should:

- encourage senior professionals to share their accumulated wisdom;
- designate individuals as practice managers for particular tasks — design, specifications, contract administration, marketing, etc.;
- encourage senior professionals to develop new skills, both for themselves and others.

Performance Review

Performance reviews are meant to be objective evaluations of employee performance. However, there is debate about the purpose of employee appraisals — whether the outcomes should be linked to salary or whether they are tools for improving employee performance. When

performance reviews are done badly, they reflect negatively on management and can lead to serious problems in morale and even legal action.

Architects can use several methods for conducting performance reviews:

- **Essay method** — This is a subjective description of the attributes of the employee. It is flexible, but time-consuming, and produces variable results if more than one supervisor is involved.
- **Management by objectives or results method** — This method measures the extent to which the employee conforms to a pre-determined goal or result. The review measures "outcomes" instead of identifying attributes of the employee. It only considers the employee's own ability to improve performance, and does not take into account other factors which may hamper performance. As well, the consequences of how the job gets done are not measured.
- **Rating scales method** — This type of performance review provides a range of possibilities (positive to negative) in response to structured and standardized questions. It is well-accepted because of its perceived objectivity; however, the questions must be relevant to various job descriptions and the appraisers must share a common understanding of the meaning of the questions.

All methods are subject to bias by the appraiser. To be meaningful, performance reviews should be done by a supervisor who is familiar with the employee and has the employee's respect. Both the employee and the appraiser should prepare in advance for the meeting. If the performance review is only conducted once a year, it should be formalized. Constructive feedback should be given at the performance review **and** on an ongoing basis. Formal performance reviews should not replace spontaneous praise or criticism, which are essential to good human resources management.

Other types of performance reviews include:

- employee self-appraisal (useful as a complement to supervisor appraisal);
- the "360 Degree Performance Appraisal" in which peers, subordinates, supervisors, and clients comment on performance.

Refer to Chapter 2.2, *Sample Forms for the Management of the Practice*, for a sample Performance Evaluation Form.

Professional Development or Continuing Education

Ongoing professional development is an important part of architectural practice. All provincial and territorial associations of architects require continuing education to maintain a professional licence or registration. The firm's resources and the principals' commitment to a "learning culture" will help determine the form and extent of professional development for employees. Professional development is good business practice. It is the equivalent of a research and development investment by other sectors of the economy. The architect should establish a variety of continuing education opportunities and learning modes, including:

- individual learning:
  - professional reading;
  - individual research;
  - professional writing (including articles, reports for journals, and newsletters);
  - speeches and presentations;
  - tours of architectural sites;
  - videos;
  - participation in the activities of the professional association.
- group learning:
  - conferences;
  - workshops;
  - courses;
  - teaching;
  - discussion groups;
  - lunch and learn seminars;
  - in-house seminars.

Termination of an Employee

Voluntary Resignation

A certain amount of staff turnover can be expected in any organization, but architectural practices experience a higher turnover rate than do many other professional firms. Voluntary resignations (quitting) occur for a variety of personal and professional reasons and often correspond to the availability of other work opportunities. Although the loss of an employee can prompt an emotional response, the architect should:

- accept the resignation gracefully if the employee cannot be dissuaded;
- not belittle or berate the employee for this decision;
- resolve the terms of termination to everyone's benefit, but complete the termination as rapidly as possible to preserve employee morale;
- conduct an exit interview to determine the reasons for the decision. (An exit interview should be conducted soon after the notice and, if possible, performed by two different individuals representing the practice);
- use the exit interview to probe for weaknesses in the practice and seek constructive criticism;
- listen and avoid being argumentative;
- endeavour to part on good terms.

Former employees may be future clients or client representatives.

Layoffs

In an economic downturn, the practice should consider all other possibilities before laying off employees. A smaller staff affects the firm's ability to gain future commissions. Some possibilities include:

- eliminating overtime;
- suspending benefits;
- reducing overhead costs;
- accelerating project start or completion dates;
- asking employees to take accrued vacation time.

If further "belt-tightening" measures are needed, consider:

- cutting salaries;
- reducing the work week for all employees;
- job-sharing;
- loaning employees to other firms temporarily.

It may be helpful to check with Human Resources and Skills Development Canada (HRSDC) regarding programs to assist companies facing layoffs.

The principals should communicate the need for adjustments to work assignments in a staff meeting as soon as the layoffs are required. However, the layoffs should be handled *first* and then followed by a meeting with the staff to allay concerns.

Firing

Firing an employee has the potential for serious legal ramifications. In all situations, the basic principles of fairness must apply. Firings must be, and be seen to be, non-discriminatory business decisions. Notice of unacceptable performance or behaviour must be documented progressively. Office policies and procedures must be applied evenly and should be used as standards for judging the employee's behaviour and performance. Performance evaluations and formal feedback can document sub-standard work. Include the employee's version of the situation as part of the investigation.

An employee should never be fired in a moment of anger or "on the spot." This may increase the likelihood of legal action. If necessary, it is better to suspend an employee for outrageous behaviour, thereby giving one time to "cool down" and investigate the matter.

Procedures for Firing and Layoffs

Termination of a valued employee is traumatic for members of the practice as well as a shock to the employee. Employees who have been fired may be hostile or even violent. The architect as employer should be familiar with the appropriate provincial or territorial employment standards and labour legislation and, if necessary, seek legal advice or assistance from a human

resources specialist. The following tips and procedures help to preserve the dignity of the employee and manage the situation:

- have both the immediate supervisor and a principal attend at the meeting at which the employee is to be fired;
- conduct the meeting in privacy, possibly outside the office;
- hold the meeting early in the day and early in the week to avoid the potential to brood or consider retaliation during the weekend (earlier in the week allows the employee to focus on the future; earlier in the day is less stressful);
- prepare ahead of time;
- communicate the reason for the dismissal but do not provide a step-by-step analysis of the documentation supporting the firing;
- advise that the decision is final and cannot be reversed;
- emphasize that all relevant factors were reviewed;
- stress that the decision was agreed to by everyone involved in management (if applicable);
- advise of the effective date of termination;
- review with the employee a written summary of benefits, including severance pay, vacation accrual, continuation of health/life insurance or other benefits;
- have final paycheques ready if termination is immediate and inform the employee about how to collect personal belongings and leave the premises; or, provide the employee with a written summary of projects to be transferred to ensure a smooth transition if the employee will remain as an active employee for a time and outline the steps in the termination process, such as last day of work, return of keys or other company property;
- finish by indicating that there will be notification of any other matters outstanding;
- wish the employee good luck for the future.

If the termination is a firing rather than a layoff, more time is required to discuss the reasons for firing by asking the employee's version of events, even if an investigation has determined this. Allow the employee to vent emotion. The principals should not interrupt or argue with the former employee, but be firm about the decision and stress that the meeting's purpose is simply to communicate an irrevocable decision.

Definitions

Employee: One who works for and under the full direction of another individual or entity (employer); a person working either full time or part time for an employer and in a manner that satisfies Revenue Canada Revenue Agency's criteria for determining employer-employee relationships.

Independent Contractor: An individual or entity that is not entirely dependent on a single source for business and is distinguished from an employee by having a chance for profit, risk of loss, and a degree of self-control and ownership of tools; a person or firm providing services who is not an employee under Canada Revenue Agency's criteria for determining employer-employee relationships.

References

Ontario Association of Architects (OAA). OAA Practice Bulletin C.3a, *Employment Agreement Checklist of Issues for Consideration*. May 1997.

Woodward, Cynthia A. *Human Resources Management for Design Professionals*. Washington, D.C.: The American Institute of Architects Press, 1990.

Canada Revenue Agency: *www.cra.gc.ca*

Service Canada: *www.servicecanada.gc.ca*

Employment Standards Acts and Regulations of the various Provinces and Territories

Checklist: Issues for Consideration in an Employment Agreement

- ❑ Determine whether the proposed relationship is that of an employee-employer or an independent contractor.
- ❑ If the relationship is one of employment, the parties should consider the following issues:
  - *Identification of Parties* — What is the legal status of the employer? Does the employer's representative have authority to commit the practice to a contract?
  - *Position* — What does the employee have to do for the employer?
  - *Commencement Date* — When does employment start?
  - *Term of Employment* — Does it run indefinitely or for a set period?
  - *Probationary Period* — Is there a probationary period? What are the conditions and obligations?
  - *Hours of Work* — What are the daily and weekly hours of work?
  - *Compensation* — What is the monetary compensation? How and when is it paid? What deductions are made? How is overtime work compensated? When is compensation reviewed?
  - *Benefits* — What are the medical, dental, and professional fees paid or other benefits offered (if any)?
  - *Office Manual* — Has the employee reviewed and acknowledged the office manual on policies and procedures? Refer to the "Checklist: Information to include in a Manual on Office Policies and Procedures," in Chapter 2.1.5, *Office Administration*.
  - *Equipment* — What will the employer provide and what is the employee expected to provide?
  - *Professional Development* — Does the employer have policies on assisting the employee gain experience, attend courses and seminars, etc., leading to improved professional status and advancement within the employer's practice?
  - *Expenses* — For what expenses is the employee compensated?
  - *Vacation, Holidays, Personal Leave* — Under what conditions may the employee take time off? Is the length of vacation adjusted with length of service?
  - *Insurance* — What provisions (if any) are included in the employer's Insurance(s)/ Indemnity Plan to protect the employee?
  - *Legal Advice* — Have the parties to the agreement sought and received legal advice?

- *Termination* — Under what conditions may either party terminate the agreement? What is the length of required notice? Does the notice period increase with length of service to the employer?

- *Confidentiality* — What information learned during the course of employment is to be kept confidential?

- *Restrictive Covenants* — Are there any non-competition requirements after termination?

- *Copyright* — To what extent may an employee in his/her proposal portfolio use the employer's copyrighted material (hard copy and/or electronic reproductions) which the employee prepared?

- *Assignment* — Can the contract of employment be assigned to a successor or other employer?

- *Severability* — Include a statement to the effect that should any part of the agreement be declared not to be legally binding, all other parts remain in force.

❑ Set out an agreement in writing and have both the employer and the employee sign and date it.

Refer to the Employment Agreement and its Guide in Chapter 2.2, *Sample Forms for the Management of the Practice*.

2.1.8 Quality Management



Canadian Handbook of Practice for Architects

2.1.8

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Challenges of Quality Management
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Quality Management Benefits

ISO 9001

Definitions

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Quality Management

Introduction

Any discussion of "quality" necessarily involves distinguishing between products and services. It could be said that the provision of quality services is synonymous with professionalism. Architects, like most other professionals, provide a "service."

Product vs. Service

It is important to distinguish between a "product" and a "service". Although architectural services usually contribute to the construction of a building (a product), the product of an architectural practice is not the building itself, but rather knowledge expressed in the form of drawings, renderings, reports and other "instruments of service". Unfortunately, clients sometimes do not have a proper understanding of this distinction and consider architectural services to be a commodity or product. When this occurs the potential value of architectural services is diminished.

A service is a set of singular and perishable benefits:

- delivered from the accountable service provider (*an architect*), mostly in close co-action with his service suppliers (*consultants*),
- generated by functions of technical systems and/or by distinct activities of individuals, respectively (*design and documentation*),
- commissioned according to the needs of his service consumers (*the building users*) by the service customer (*the client*) from the accountable service provider (*the architect*),
- rendered individually to an authorized service consumer at his dedicated request (*the client's representative*),
- and, finally, consumed and utilized by the requesting service consumer for executing and/or supporting his/her day-to-day business tasks or private activities (*for pricing and construction of a building*).

- Definition adapted from Wikipedia

In architecture, the service should be delivered in a competent, professional, and timely manner incorporating good skills in communication, planning and organization, and synergistic problem-solving.

What is Quality?

Although no universally accepted, clear or rigorous definition of quality exists, certain elements help to define quality as it relates to architectural services. These elements (adapted from the Standards Council of Canada) include:

- providing value to clients;
- doing the right things — right the first time, on time, all the time and to the client's satisfaction;
- fitness for purpose (offering solutions that fit the purpose);
- providing service which consistently meets or exceeds performance levels required by the client.

According to the International Organization for Standardization (ISO):

> *Quality is the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs*.

Long before the service sector of the economy took a strong interest in quality, manufacturing industries recognized the following principles:

- quality is determined to a much greater degree by management than it is by staff or workers;
- quality applies both to the product itself and the process of creating that product (service);

- the cost of avoiding mistakes is usually less than the cost of correcting them;
- quality must be planned, not simply inspected for;
- as quality goes up, some costs go down.

Quality can be achieved only when the services are delivered in a consistent, professional manner. Because of the diversity and complexity of architectural practice, the achievement of quality is an ongoing challenge. This chapter briefly discusses Quality Management within an architectural practice.

Terminology

Over the years, management consultants and standards-writing organizations have developed terms which relate to quality. Understanding this terminology is important.

Quality Management

Quality Management refers to what an architectural practice does to manage its processes and activities (the architectural services it delivers).

Quality Management is a systematic way of achieving quality at every stage of a process to ensure that the client's requirements are met on time and all the time. A small practice may have no "quality management system" as such, whereas a larger practice may have extensive written procedures, instructions, forms, and records — in other words, a system.

Quality Assurance

Quality Assurance is sometimes used incorrectly, and interchangeably, with "quality control." It can be defined as: all the planned and systematic activities implemented within the quality management system and demonstrated as needed to provide adequate confidence that an architectural practice will fulfil requirements for quality. For example, an architect's field review could be considered *"quality assurance"*; whereas, the builder's supervision could be considered *"quality control."*

The adoption of a quality management system provides **assurance** to clients and others that the **service** will be **consistent**. Currently, ISO 9000 certification is a mark of Quality Assurance. "Peer review" or some other form of verification may assist in quality assurance. A peer review is an independent, unbiased review — by a professional — which may examine:

- the policies and practices of the entire office;
- a single project, or design phase of a single project.

Total Quality Management

Total Quality Management (TQM) is a term originally used by the U.S. Navy to describe a Japanese-style of management which is based on the participation of all members of an organization in improving an organization's processes, products, services, and culture.

TQM includes the concepts of:

- continuous improvement;
- empowerment of staff;
- development of a program to prevent errors.

Management System Standards

Management System Standards, or "generic" management system standards, are standards which apply to any organization, large or small. They outline a "quality assurance model" to set up and operate a management system.

Management system standards are different from standards developed for physical products and processes, which are very technical and specific. For a description of these "technical" standards, refer to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*.

Quality Management Systems in Architectural Practice

Quality management for architects focuses on a process to ensure that professional services are consistent and continuously improving. This process will vary from practice to practice and from project to project. A good quality management system has the following objectives:

- ensure a common understanding of the service required and expected;

- ensure that the client receives the expected service and always remains satisfied;
- prevent errors in all aspects of architectural practice;
- prevent delivery delays;
- reduce the costs of architectural practice;
- increase productivity;
- continuously improve the reliability of services;
- meet all the quality assurance requirements agreed to by the client and the architect.

Implementing a quality management system requires the architect or managing principals to:

- seek work that falls within the expertise of the practice and its consultants;
- recruit, train, and retain staff who contribute to both their own individual success and the success of the practice;
- realize the potential of every staff member by providing consistent and creative work methods as well as opportunities for greater involvement;
- facilitate the staff's professional development;
- ensure that all staff participate in, and influence the quality of, service provided to clients;
- ensure that tasks to be performed and objectives to be achieved are understood, including how they affect quality;
- encourage contributions that enhance quality by giving due recognition and reward for achievement;
- assess periodically the factors that motivate personnel to provide quality service;
- use appropriate information technology and management methods;
- provide a work environment that fosters excellence;

The Royal Institute of British Architects (RIBA) recommends a two-tier approach to a quality management system:

- quality management for the practice;
- quality management for the project.

Quality Management Systems for the Practice

No matter how the practice is organized, ensuring the provision of quality architectural services requires that a number of strategic and administrative functions must be in place, including:

- a committed leadership;
- a mission statement and possibly also a "quality" statement;
- a clear organizational structure (refer also to Chapter 2.1.1, *Organization of an Architectural Practice*);
- a staffing plan and opportunities for professional development and empowerment (refer also to Chapter 2.1.7, *Human Resources*);
- an office manual on policies and procedures (refer also to Chapter 2.1.5, *Office Administration*);
- good document and data filing and retrieval systems (refer also to Chapter 2.1.5, *Office Administration*).

Quality Management Systems for the Project

The quality management system must be used for every project and for every phase of the project. This includes thorough project planning to ensure that services are delivered on time, accurately, and within budget.

Some architects become members of the Project Management Institute or PMI which has developed and perfected the practice of project management by identifying, defining, documenting generally accepted project management practices and a common project management lexicon. These PMI standards may help architects further their project management skills. More information can be found at *www.pmi.org*

Refer also to Chapter 2.3.1, *Management of the Project* and Chapter 2.1.9, *Risk Management and Professional Liability*. Prior to obtaining a commission it is important to have certain quality management procedures in place in order to determine which prospects to pursue, to screen potential clients, and to assist with contract negotiations. After a project is obtained, the following four activities must be considered in planning and implemention.

1. *Project Planning,* including:
   - design and construction schedule;
   - construction budget;
   - design requirements;
   - communications;
   - staffing requirements;
   - risk management;
   - method of construction project delivery;
   - project cost control.

2. *Project Definition*
   This is the pre-design or analysis stage of a project, used to determine quality requirements, including implied and stated needs. Ideally, these needs are described in a functional program provided by the client. (Refer also to Chapter 2.3.4, *Pre-design*.)

3. *Project Design and Documentation*
   The quality management system should be applied to all processes during the following project phases: schematic design, design development, and construction documents. (Refer also to Chapter 2.1.9, *Risk Management and Professional Liability*, which provides guidelines for checking documentation; Chapter 2.3.6, *Design Development*; Chapter 2.3.7, *Construction Documents — Drawings*; and Chapter 2.3.8, *Construction Documents — Specifications*.)

4. *Project Implementation*
   Quality management systems must also be applied throughout the construction process, including:
   - procurement (refer also to Chapter 2.3.9, *Construction Procurement*);
   - construction monitoring and control (refer also to Chapter 2.3.10, *Contract Administration — Office Functions*, and Chapter 2.3.11, *Contract Administration — Field Functions*);
   - close-out, commissioning, and and post-construction services (refer also to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations*).

Challenges of Quality Management

Many challenges must be overcome to implement a quality management system in an architectural practice.

Resistance to Change

Some claim that the greatest challenge to implementing a quality management system is due to human nature and our resistance to change the unique culture prevalent within any profession. The culture is influenced by the following realities:

- professionals are very diverse and individualistic;
- professionals require self-actualization and they need to feel in control of their destiny;
- professionals are creative and require an environment conducive to creativity.

These characteristics may contribute to a reluctance to adopt systematic quality management, because they:

- fear losing individual control over their work processes;
- perceive that such a system creates a work environment that stifles creativity;
- believe that a quality management system controls the design process.

Size of Architectural Practice

Because small practices have the advantage of being "tightly knit" firms with few staff to consult and train, one might assume that implementing a quality management system within such a firm would be easy. However, small firms often lack the financial resources and time to develop policies, procedures, and standard documents. In addition, client demands and cash flow may not provide management (often a sole proprietor) with adequate time to develop and implement a quality management system.

Larger architectural practices are usually able to dedicate more time and resources to quality management systems. Because of their size, larger firms may have had to establish certain policies and procedures. The greatest challenge for larger practices in implementing an effective quality management system is winning the acceptance of all staff including principals, who may have strong views on work processes and a strong need to control their careers and destinies.

The length of time required to achieve measurable results with a quality management system may seem excessive. Architectural practices focus on project work, and may find it difficult to get excited about — and make time for — the implementation of a quality management system. A quality management system should be regarded by staff as improving, not hindering, efficiency. Foresight and commitment are needed to realize of the benefits that can be derived from a quality management system.

Quality Management Benefits

Effective quality management systems do pay off in the following ways:

- improved service and client satisfaction;
- improved efficiency and effectiveness and ultimately higher profit margins;
- increased "marketability";
- greater "peace of mind" for principals dedicated to quality;
- improved processes and procedures which result in successful building projects;
- greater job satisfaction.

The greatest potential benefit of widespread implementation of quality management systems is an improved public perception of the architectural profession. Quality management can help to ensure that the services and the work of architects are respected and successfully transformed into buildings that improve the human condition. Smaller architectural practices may chose to develop a simple quality management system based on using the many Checklists found in this Canadian Handbook of Practice for Architects, whereas larger firms may elect to adopt a more complex quality management system such as ISO 9001 and become ISO certified.

ISO 9001

The International Organization for Standardization (ISO) has developed the 9000 series of standards for quality management. It consists of standards and guidelines relating to quality management systems and related supporting standards. Some of the benefits claimed by the ISO 9000 quality systems are:

- an internationally consistent set of standards;
- a single set of standards applicable to all industries;
- objective, third-party verification of quality assurance;
- opportunity for continuous improvement.

ISO 9001: 2008 provides a set of standardized requirements for a quality management system, regardless of what the organization does, its size, or whether it is in the private, or public sector. It is the only standard in the family against which organizations can be certified – although certification is not a compulsory requirement of the standard.

Once an architectural practice has instituted an ISO 9001 quality system, the practice may become registered by undergoing an audit conducted by a third-party certifier. Upon registration, the architectural practice can "market" itself as being "ISO Certified."

Definitions

Evaluation: Evaluation involves assessing the strengths and weaknesses of programs, policies, personnel, products, and organizations to improve their effectiveness.

Quality Assurance: All the planned and systematic activities implemented within the quality system and demonstrated as needed to provide adequate confidence that an architectural practice will fulfil requirements for quality.

Quality Control: Operational techniques and activities that are used to fulfil requirements for quality.

Total Quality Management: A management approach of an organization centred on quality, based on the participation of all of its members and aiming at long-term success through client satisfaction and benefits to all members of the organization and to society.

Verification: Confirmation by examination and provision of objective evidence that specified requirements have been fulfilled. [Note: verification typically deals with a "process," whereas validation is concerned with a "product."]

References

The American Institute of Architects (AIA). *The Architect's Handbook of Professional Practice – Fourteenth Edition*. Washington, D.C.: John Wiley & Sons, 2008.

Harrington, H. James and Dwayne D. Mathers. *ISO 9000 and Beyond: From Compliance to Performance Improvement*. New York, NY: McGraw-Hill, 1996.

International Organization for Standardization (ISO). Geneva, Switzerland.
www.iso.org/iso/home.htm

Johnson, Perry L. *ISO 9000: Meeting the International Standards*. New York, NY: McGraw-Hill, 1996.

Project Management Institute. *A Guide to the Project Management Body of Knowledge*. Third Edition. Project Management Institute, 2004.
www.pmi.org

Riddle, Dorothy I. *Quality Assurance in Services: An ISO-9000 Workbook for Small Professional Service Firms*. Ottawa, Ont.: Industry Canada, 1995.

Royal Architectural Institute of Canada (RAIC). *ISO 9000 and Your Practice*. RAIC Practice Builder. Ottawa, Ont.: RAIC.

Saylor, James H. *TQM Simplified: A Practical Guide*. Second edition. New York, NY: McGraw-Hill, 1996.

Shearer, Clive. *Practical Continuous Improvement for Professional Services*. American Society for Quality, 1994.

Stasiowski, Frank A. and David Burstein. *Total Quality Project Management for the Design Firm: How to improve quality, increase sales, and reduce costs*. New York, NY: John Wiley & Sons, 1994.

Stimson, William A. *Beyond ISO 9000: How to Sustain Quality in a Dynamic World*. Washington, D.C.: American Consulting Engineers Council, 1998.

Walton, Mary. *The Deming Management Method*. City: Putnam Publishing Group, 1988.

Williams, David J. *Planning a Quality Management Process for Architects & Engineers in Private Practice*. 1997.



2.1 Management of the Practice

2.1.9 Risk Management and Professional Liability

Canadian Handbook of Practice for Architects

2.1.9

Introduction

Risks Related to Management of the Practice
- Setting up a Practice
- Professional Liability Insurance
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Risks Related to Management of a Project
- Clients/Projects — GO NO-GO
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GO NO-GO Checklist to Assess the Degree of Risk

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Chart: Comparison of Statutes of Limitations in Each Province

Risk Management and Professional Liability

Introduction

Every business enterprise involves risk. Management of risk requires the identification of potential risks, an assessment of the degree of risk, a considered decision of whether or not to assume the risk, and, if the risk is assumed, what steps to take to mitigate any potential impacts.

Liability for professional services performed is one risk encountered by every architectural practice. Incorporated architectural practices (where permitted) can limit some of the liabilities for the business side of their operations. However, all architects are liable for the professional services they provide.

To a certain degree, risk management is the application of "common sense" and involves proper consideration of all the issues and their potential ramifications.

Risks occur throughout an architect's career, from setting up a practice, during the life of the practice, and after retirement. One can never totally eliminate risk. Inaction can sometimes be riskier than action, and either course can have unforeseen consequences.

This chapter cannot deal with every conceivable risk in an architect's practice,
but will review certain kinds of risks in order to assist the architect in developing a risk management strategy.

Risks Related to Management of the Practice

Setting up a Practice

Refer also to Chapter 2.1.1, *Organization of an Architectural Practice*, for further information on setting up a practice.

The architect should check the regulations of the provincial or territorial association of architects, particularly those requirements for:

- structure and ownership of an architectural practice;
- permitted names for an architectural practice;
- other operating requirements such as:
  - *bona fide* address;
  - telephone, etc.

In addition, the architect should confirm the following requirements of municipal authorities:

- business taxes;
- zoning or land use restrictions for the proposed office.

At the outset, the principals should prepare a "strategic plan" which includes a business and financial plan. Refer also to Chapter 2.1.4, *Financial Management*, and Chapter 2.1.1, *Organization of an Architectural Practice*, for more information on these plans.

Professional Liability Insurance

One method of mitigating risks is to obtain and maintain professional liability insurance (sometimes referred to as Errors and Omissions Insurance). This type of insurance is mandatory in some provinces. Refer to "Comparison of Provincial Provincial and Territorial Requirements regarding Professional Liability Insurance" in Chapter 1.1.4, *The Organization of the Profession in Canada*.

All architects are expected to perform their services to a "**professional standard of care**." This means that architects are required to provide service with the degree of care and skill that would be rendered by reasonably competent architects under the same circumstances and in the same geographic location. An architect who does not meet this standard may be found to be **negligent**.

An architect found liable for an honest error or omission or held to be negligent can be held personally accountable for the damages. Professional liability insurance provides protection from such claims and is intended to cover such liabilities.

A professional liability insurance policy does not necessarily afford total protection, because insurance policies typically have exclusion clauses which void coverage for certain specific activities. The architect should read and understand the policy and pay particular attention to exclusions. Premiums are usually proportionate to the volume of work in the practice. It may be necessary or prudent to purchase excess coverage over and above the basic level of protection required by the regulations or legislation of a particular province. If possible, the excess coverage should cover any exclusions in the primary policy. Excess insurance coverage for a specific project is typically a reimbursable expense.

The *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six* contains a clause, GC 7.2, limiting the architect's liability to the client. A similar clause should be included in all other non-standard, client-architect agreements. However, this clause will not limit exposure to third parties; therefore, additional coverage may still be advisable.

If a situation arises in which the architect believes that a claim might be made, the architect should discuss the situation with the professional liability insurer to minimize exposure. Notify the insurer at the first indication of the likelihood of a claim and follow the insurer's advice in order not to put the insurance coverage at risk.

Every province and territory has a different statute of limitations. These statutes of limitations usually provide a time limit when a claim can be made. These laws indicate the number of years after which no legal proceeding may be undertaken following a date when the damage (or negligent act) was discovered or ought to have been discovered. However, no time limitation applies to recognition of damage (or negligence) in the life of a building. In other words, professional responsibility and potential liability for each and every project remains with the architect for life.

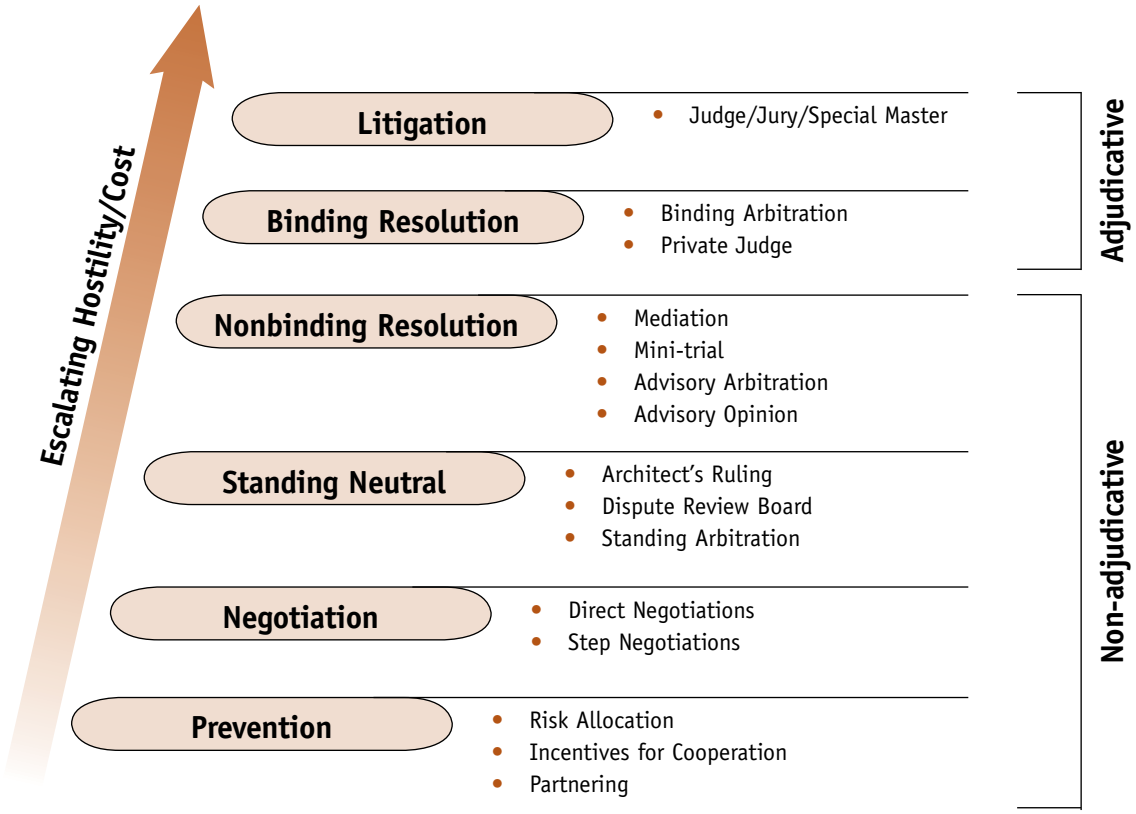
In Québec, the liability of architects is based in the following articles of the Civil Code:

Article 1457 — General Liability
Article 1458 — Contractual Liability
Article 2118 — One Year Liability for workmanship of a Contractor
Article 2120 — Five Year Liability in the case of loss of work — this is joint and severable with engineers and the contractor with the possibility of release.

Refer to the "Chart: Comparison of Statutes of Limitations in Each Province and Territory" at the end of this chapter.

The architect should always require sub-consultants to carry professional liability insurance with the appropriate coverage for each project. All consultants should be required to verify that they have obtained this coverage when the architect engages consultants for a project.

Illustration 1: Dispute Resolution Steps



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DPIC — Security Insurance Company of Hartford

Alternative Dispute Resolution (ADR)

In the event of a dispute, the architect may occasionally be requested to participate in some form of Alternative Dispute Resolution (ADR) such as mediation or arbitration. ADR is a conflict management strategy that seeks to avoid the very costly and very lengthy process of litigation. This approach is usually proposed when amicable negotiations do not achieve a mutual agreement to resolve a matter under dispute. Always discuss a proposal for ADR with your lawyer and the professional liability insurer prior to agreeing to participate. The insurer or their legal counsel may wish to represent the architect in these circumstances.

The ideal, of course, is to avoid disputes in the first place. Clear, concise, correct, well-coordinated, and well-checked contract documents will reduce the likelihood of a dispute, but cannot totally eliminate the possibility. Equally important, are regular and good communications with all members of the project team.

Illustration 1 shows a sequence of dispute resolution techniques. These methods of ADR are ranked in ascending order from low to high escalation of hostility and of costs for the parties in dispute.

Partnering

Developed as a method of **dispute avoidance**, partnering has the following objective: to solve problems as they arise, in a manner that will best achieve agreed-upon collective goals rather than trying to affix blame. Partnering involves a team comprised of owners, design professionals, and contractors (prime contractors and sub-contractors). Each participant in the process earns the trust, respect, and understanding of the others concerning the expectations, goals, and objectives in implementing a construction project. This is often accomplished through a facilitated working session or meeting. Partnering typically takes a few days of meetings which culminate in the issuance of a "charter" stating the mutual "buy-in" or acceptance by the partners to the project's common goals.

As with all contractual relationships, the "chemistry" among the participants must be compatible; partnering can enhance the chemistry but will not likely replace it.

Negotiation
In the event of a dispute, the parties may initially attempt to resolve the matter by negotiation. Negotiated settlements based on strict interpretation of the terms of a contract are generally less successful than those negotiations which focus on the underlying interests of the parties.

Mediation
When two or more parties mutually agree to refer their dispute to mediation, a neutral person is usually appointed to act as a mediator. The mediator is a type of facilitator, assisting the parties in their negotiations with one another to resolve or settle the dispute. The mediator:

- does not impose a settlement;
- is not a decision-maker;
- does not act as an expert providing an opinion.

Although the mediator does not need to have special expertise in the matter under dispute, some parties may believe that such expertise is useful.

Once a settlement is made, appropriate written documentation — which releases someone from an obligation or from further legal action — is necessary. These releases should be prepared by a lawyer.

Mediation is not usually successful unless both parties are willing to compromise.

Arbitration
In arbitration, two or more parties submit a dispute to an independent and impartial arbitrator or arbitration panel, mutually agreed upon by the parties in dispute. The arbitrator makes a final and binding determination in a judicial manner. The experience and qualifications required for an arbitrator are similar to those required for a judge. An arbitrator must have knowledge of:

- the law, in order to allocate liability between the parties in dispute and determine the amount of related damages;
- statutory procedures applicable to conducting a hearing;
- relevant legislation, relating to arbitration and judicial procedures.

Special expertise in the matter under dispute is not required, although this knowledge may be helpful. The parties must pay for the arbitrator or arbitration panel as well as the venue and other costs. As there are legal and professional liability insurance implications in arbitration whether participating as a witness or as a party; therefore, legal and insurance advice should always be obtained before agreeing to participate in any arbitration. Most professional liability insurers for architects prefer to avoid arbitration.

Records

Depending on the provincial statute of limitations or other regulations regarding an architect's archives, it may be necessary to store the large quantities of documentation, files, and drawings which a practice will accumulate over time. Accurate and comprehensive records can be invaluable when mounting a defence against a claim. Because a long period of time can elapse between the filing of records and the need for retrieval, it is important to establish a retrieval system that can be easily understood and accessed by the senior members of the practice.

"How long?" and "What type of documentation to keep?" remain a dilemma for most architects. Advice should be sought from a lawyer and the professional liability insurer. If the documentation is not copied onto paper then the architect should obtain electronic media that will endure and ensure that hardware and technology to access and read the information is available. Refer also to Chapter 2.1.5, *Office Administration*.

In some cases, long-established practices have had to defend against a claim related to a project designed and constructed before any of the current principals or staff were part of the practice. The records of these projects are the sole source of reference to the project and activities at the time.

Getting Paid

One of the risks an architect faces is a client who, for whatever reason, is delinquent in honouring a contractual obligation to pay invoices in a timely manner.

The following tips help to reduce the risk of late payment or non-payment of invoices:

- Obtain a retainer representing 5% to 10% of the total fee at the execution of the contract.
- Advise the client that the retainer will be applied against the final invoice. (Note: some architects are reluctant to request a retainer, although many architects do ask for and receive retainers on a regular basis. If the retainer is not requested, it is not likely that one will be offered. A retainer is especially important if the client is unknown to the architect or has a reputation for being difficult to collect from.)
- Ensure that the terms and conditions of the agreement have been discussed with the client, including the right to stop rendering services in the event of non-payment of fees.
- Issue invoices twice a month, every second week, or weekly, in some cases. (Although invoicing is typically a monthly operation, there is no obligation to be bound to a monthly policy. More frequent invoicing will not only improve cash flow, but will be an early alert of a delinquent payer. Using computer software for invoices can facilitate more frequent invoicing.)
- Include a statement of interest on overdue accounts. (Because an architectural practice is not a financial institution, the rate of interest should never be more attractive than that charged by those who fund projects. Even if there is no intention to charge and collect the interest, it should be included in the agreement and its impact on overdue accounts demonstrated in a statement of account.)
- Separate the fees for professional services from reimbursable expenses by using two separate invoices. (This may reduce the chances that the client may withhold payment of an invoice by questioning one or two small items.)
- Follow up invoices to certain clients with a telephone call, after an appropriate period of time, asking whether payment can be expected within the agreed-to time period. (Do not wait until the payment is overdue to make the call. Establish and implement a policy for a sequence of "reminder" calls, perhaps one week apart. Each call should be polite but firm, and after the first two calls, ask for a meeting if payment has not arrived by the due date.)
- Send a letter to the client outlining attempts to receive payment to date, if past-due payment has not been received after three weeks of calls and a meeting. The letter should state that at no time has the client expressed any problem with the invoices. Refer to the clause in the contract providing for the withholding of services for non-payment and express the wish not to have to invoke this, which could seriously affect the success of the project.
- Be aware of provincial lien legislation, particularly for different time limitations for filing a lien for a "contractor" (prime consultant) or "sub-contractor" (sub-consultant). Be prepared to initiate lien action within the time periods specified in the legislation.

Stopping Work

- Advise the client that non-payment or late payment is a serious matter and that services will be stopped if payment is not received and consider seeking legal advice before stopping services.
- Stop work if necessary — if services are not halted at the first instance, there will be no credibility if late payment should re-occur.
- Consider one or more of the following actions:
  - send a lawyer's letter to the client;
  - file a lien against the property (Refer also to Chapter 2.3.12, Take-over Procedures, Commissioning, and Post –Occupancy Evaluations);
  - attempt to reach an agreement through a mediation process;
  - attempt to reach a decision through an arbitration hearing;
  - turn the collection over to a reputable collection agency;
  - initiate legal action.

[Note: the final alternative to withholding services may be to resign the commission.]

- Notify the building department, whether or not the decision is to withhold services until payment is made, or to resign the commission. These Authorities rely on the architect to provide a general review of the project and in some jurisdictions, "letters of assurance" at the completion of a project.
- Be ready to prepare a defence against counter-claims by the client, whatever course of action is selected (mediation, arbitration, lien action or litigation). The client may make a variety of accusations, including poor performance and negligence.
- Take care not to issue idle threats: if legal action has been threatened for non-payment of an invoice by a certain date, be prepared to initiate the action on the following day.
- Record all communications regarding collection, including all attempts at contact for purposes of payment (faxes, E-mail, phone calls, letters, memos, conversations). These records will be important in formal hearings in resolving the matter of collection.

Risks Related to Management of a Project

Clients/Projects — GO NO-GO

Each prospective client and each prospective project should be considered in a similar fashion, whether the architect is:

- pursuing a specific sector of the market;
- responding to a request for proposal;
- entering a competition;
- negotiating with a single client for engagement of services.

This consideration includes a rigorous appraisal of the commission against a "GO NO-GO" checklist. Such a checklist identifies the risks involved if the architect decides to pursue the "opportunity." Many checklists have been developed by both large and small practices, and by management companies and financial advisors. Some checklists are short and others exhaustive. Some use a rating formula (for example, if 5 out of 20 questions score negatively, the project should not be pursued). Other checklists permit the architect to determine the degree of risk after answering all the questions. The architect should recognize that the honest answer to a number of questions may be "don't know."

There is a common misconception that the GO NO-GO analysis generates only one of two responses. However, the main function of the checklist is to identify which issues need to be changed in order to move from a NO-GO to a GO position, particularly if these issues are readily negotiable or can be corrected.

One of the hardest lessons for an architect to learn is when to decline a project opportunity. A proper GO NO-GO checklist and subsequent analysis can help make such a decision.

Each practice should devise its own GO NO-GO risk analysis process and use it rigorously prior to accepting a commission. The analysis can minimize the risks of accepting a commission under poor terms or conditions.

Refer to the "GO NO-GO Checklist to Assess the Degree of Risk" at the end of this chapter.

Assembling the Consulting Team

If the GO NO-GO checklist process leads to pursuit of the project, it will be necessary to minimize risk by assembling the proper consulting team. The architectural practice may need to hire additional staff, form a strategic alliance with another practice to become a sub-consultant, or form a joint venture with another practice. Each of these options requires careful consideration concerning:

- the competitive position of the practice;
- the performance of services in the event of success in being awarded the project.

Use the "Checklist: Issues to Consider When Assembling the Consulting Team," at the end of this chapter, to select the main engineering sub-consultants (structural, mechanical, and electrical engineers).

Even if the client plans to engage the consultants directly through separate agreements, the architect will usually be engaged to manage and coordinate their work; therefore, the above referenced checklist is still relevant.

It is also important to recognize the importance of team "chemistry." The success of a project

often depends on team chemistry, that is, the ability of all team members to work well together.
The use of the same consultants on a continuing basis may save the architect time, money, aggravation, and billable time, thereby improving overall quality, coordination, client satisfaction, and project profits. On the other hand, selecting new or different consultants for a specific project may put the architect in a better position to be awarded the commission, particularly if special expertise or client preferences are a consideration.

A written agreement should be prepared outlining the roles, expectations, and responsibilities as well as payment for each consultant. Avoid relying on past experience as the normal method of operating. Good relationships can be soured because of a lack of mutual understanding of routine items such as the scope of services, the number of site visits or the responsibility for the review of shop drawings. Nothing should be taken for granted. The use of the *Canadian Standard Form of Contract Between Architect and Consultant: RAIC Document Nine* is recommended.

Client-Architect Agreements

Good contracts always allocate risks fairly. It is not only professional, but also good business practice, to have a clear, written agreement which outlines the roles and responsibilities of both parties. The use of the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six* or *Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: RAIC Document Seven* is always recommended.

There is no reason to use a customized letter as a form of agreement in place of the Standard Forms of Agreement. Some architects argue that the standard forms of agreement will "intimidate the client." However, these same "timid" clients may have no difficulty in launching a lawsuit against the architect. Often, the lawsuit will be over the very issues covered in the "intimidating" standard form of agreement, but which are not included in the customized letter form of agreement which was executed. Oral agreements should **never** be used. The RAIC and most provincial associations of architects have a short form agreement to be used as an interim or "binder" agreement until a full standard form of agreement can be prepared and executed. The *Short Form Agreement Between Client and Architect – RAIC Document Eight* is available on the RAIC website for downloading.

One of the best ways of minimizing risk is to spend time with the client at the outset, carefully discussing the client-architect agreement, clause by clause, describing:

- what services will be provided;
- what the services entail;
- what will **not** be included in the agreement.

Architects must manage expectations as well as risks. Problems often occur later in the project because the expectations of the two parties differ. Early review of the agreement helps to avoid problems. Amendments to the standard forms of agreement should be included only if necessary, and if signed or initialled by both parties.

If the client is a corporation, ensure that the person signing the agreement for the client actually has the authority to commit the corporation. If in doubt, request a copy of the appropriate minutes of the board of directors meeting which confers such authorization on the individual.

Some corporate and institutional clients, particularly larger companies and some government departments, will prefer to use their own "standard agreement" forms instead of the *Canadian Standard Forms of Contract Between Client and Architect*. These agreements generally are written in favour of the client, often to the detriment of the architect's interests. Prior to executing such an agreement, the architect should review it carefully with legal counsel and with the professional liability insurer to ascertain the extent of risk that is being assumed over and above those risks in the standard forms of agreement.

Client-initiated variations to the standard forms of agreement often include the following phrases:

- *architect to warrant contractor's work;*
- *architect to assign copyright to client;*
- *client will not pay for reproduction of drawings;*

- *architect will supply a stipulated number of construction drawings and specifications;*
- *architect will guarantee building permit will be issued;*
- *architect will guarantee construction cost estimate;*
- *architect will guarantee LEED® certification;*
- *architect will visit site only when called by client;*
- *architect will engage surveyor, geotechnical engineer, and hazardous materials consultant.*

Certain clients say, "All other architects accept and sign this agreement, why won't you?". This statement is a "red flag," and the architect should seriously consider whether or not to assume such risks by signing the agreement. Consider the following:

- the statement is incorrect — "all other" architects do **not** sign such agreements;
- others may have signed against their better judgement and crossed their fingers hoping all goes well (all may indeed go well, but is it worth the gamble?);
- other architects have signed and have suffered the consequences or damages.

When such clauses are proposed, the prudent architect should:

- discuss the questionable clause with architects who have allegedly signed it;
- review the proposed agreement with legal counsel, the professional liability insurer, and the provincial architectural association;
- determine the extent to which the practice can be exposed to such risk;
- attempt to negotiate contract changes with the client.

Many clauses inserted in contracts not only increase the architect's liability but also are not covered by professional liability insurance. Examples include:

- warranty of performance;
- guarantee of conformity to code;
- guarantee the work of all others.

The architect should **never** warrant or guarantee any aspect of professional services.

When the architect is prepared to sign a contract with such adjustments and assume the subsequent risks, it is prudent to review the portions of the agreement that will be the responsibility of the sub-consultants and to obtain their concurrence **before executing the agreement** with the client. For example, sub-consultants may not be prepared to relinquish their copyright, even though the architect may be prepared to do so. These issues must be resolved prior to execution of the contract, or the architect will not be in a strong negotiating position after the agreement has been executed.

Many clients, in the interest of being, or appearing to be, environmentally conscientious, may request that their buildings meet, or be certified by, a sustainable building rating system, such as LEED®. The architect should never guarantee or warrant that a building will be certified. Such certification involves not only specific design elements but also construction procedures to be done by the builder, and certain operating and documentation standards by the owner, all of which are beyond the control of the architect. Furthermore, the certification is based on an assessment by an independent review agency and it is impossible to guarantee the agency's conclusion in advance. Finally, the architect must be a cautious to not promise unsubstantiated performance of sustainable design features, such as increased employee productivity or reduced employee turnover, which could result in a claim by a dissatisfied client.

The Project: Design and Documentation

The three main risks in the design and construction documentation phases of an architectural project are:

- the practice will lose money in producing the documents;
- the project will be over budget;
- an error or omission in the documents will result in a claim.

Note: As of 2009, there is no significant history in the use of Building Information Modeling or BIM, many of its proponents claim that these new documentation and modeling techniques will reduce conflicts between design elements, result in better coordination of construction documents, and therefore reduce claims. There now exist new forms of contract produced by the American Institute of Architects to accommodate projects using Integrated Project Delivery with

BIM, as well as Building Information Modeling Protocols or appendices to accompany standard client-architect agreements. It is premature to assess the legal consequences of these forms of contract and architects should review these types of contracts with their lawyer.

Consider the following issues in managing risks related to design and documentation:

Composition of the Design Team
The "chemistry" among the various people on the project may require re-assessment. (Consider changing the personnel if working relationships are not harmonious.)

Professional Fees
If the fees for a particular project are not commensurate with the professional services required, the architect should attempt to renegotiate. If the fees cannot be re-negotiated, the experience and "lessons learned" should be taken into consideration when calculating fees on future projects. In any event, **the professional services must not be compromised**. Do not assume that the loss will be offset by gains during the contract administration phase; surveys indicate clearly that profits during contract administration are generally only 50% of profits in the earlier phases of a project.

As mentioned above, the fee must always be commensurate with the scope of services required for the project. Refer to *Mastering the Business of Architecture* (outside Ontario, called *Mastering the Business of Design)*. This publication itemizes services that the architect can provide. The client and the architect can jointly use the publication to select the services required for a specific project, following which the two parties can readily establish and agree upon an appropriate fee.

Refer also to the RAIC document, *A Guide to Determining Appropriate Fees for the Services of an Architect*.

Method of Project Delivery
There are several methods of project delivery and each has unique risks for the architect.

Refer also to Chapter 2.3.2, T*ypes of Construction Project Delivery*.

It is critical that the role of the architect and the scope of services for each project delivery method is clearly understood and that the correct form of contract is used. Architects should consult their lawyer and professional liability insurers about any contracts when they are considering entering into an agreement for a method of project delivery for which they are not familiar.
Some governments are using new forms of project delivery such as Public–Private Partnerships or "P3s" to transfer some risks to the private sector (there is different terminology in various jurisdictions for this form of project delivery). As most P3 projects are usually very significant and the stakes very high, all architects are advised to ensure that all professional service contracts for P3 projects are developed and reviewed by their lawyers and professional liability insurers.

Project Management
Use some form of project planning to track actual costs (time and expenses) against those anticipated. This information can provide historical data and to assist in future project planning such as assignment of personnel.
A number of software programs are available to facilitate the management process.

Refer also to Chapter 2.3.1, *Management of the Project*, and to the Appendices in Chapter 2.3.2, *Types of Construction Project Delivery*.

Checklists
One of the most important elements in the management of risk is a thorough and comprehensive checking process. Unfortunately, this is often rushed or omitted due to inadequate scheduling or unreasonable deadlines. **This element may be the singular most important one in mitigating the risk of incomplete, incorrect, non-comprehensive or uncoordinated documents**. Many practices develop and use exhaustive checklists to ensure that the many items required to complete a set of drawings have been included.

A proper checking process is highly disciplined and should be followed rigorously. A simple method is to apply — *without exception* — the rule that the drawings and specifications are not to be sealed until after the checking process has

been completed.
For other checklists, refer to "Checklist for the Management of the Architectural Project" in Chapter 2.3.1, *Management of the Project*, and to the references in Chapter 2.3.7, *Construction Documents — Drawings*.
Someone other than the originator (designer or CAD technician) should check drawings. Once the documents are assembled for checking, consider using a colour-coded checking process for printed checksets as follows:

- *Step 1*: Check all notes and dimensions. Use a yellow line to cover the agreed-to or correct items, circle incorrect items with a red line, and place the corrected item or information next to the red circle.
- *Step 2*: After the "red-lined" information is corrected, draw a green line over the item on the marked-up print immediately after the correction is made on the original. The individual who did the original checking with red and yellow lines should be the same one to review the corrected original against the red-lined version to confirm that all corrections have in fact been made.
- *Step 3*: Upon confirmation, a heavy black line is then drawn across the green line on the marked-up print. The checking process is not complete until every print is fully marked with yellow for correct items and red-plus-green-plus-black for items requiring correction.

This process — known as "back checking" — is not complete until the back checker signs off on each print. Only after "sign off" are the documents ready for seal and signature, and not before.

Checking to this extent is time-consuming. However, such a rigorous check will avert problems later on, when they are much costlier to correct. All architects should allocate and budget appropriate time for this aspect of risk and quality management.

The Project: Bidding and Contract Award

The risk of litigation by unsuccessful bidders can be minimized by using clear and concise criteria setting out the method of contractor selection, and adhering strictly to these criteria. The architect should use standard bid documents and become familiar with CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts*.

All privilege clauses in the bid documents — such as *"The lowest or any bid may not necessarily be accepted"* — should be reviewed and written based on based on Section 2.0, The Principles of the Law of Competitive Bidding in CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts*.

A decision to award the contract to other than the lowest *bona fide* bidder can cause legal action. To minimize this risk, the architect should advise the client to obtain legal advice respecting any award to other than the lowest bidder.

The Project: Contract Administration

This phase of the project is prone to many risks which expose the architect to potential claims. Refer also to Chapter 2.3.11, *Contract Administration — Field Functions*, for more detailed information. The architect can reduce these risks by rigidly adhering to standard routines, forms, and policies. Some of these include:

- pre-construction meeting procedures;
- a pre-packaged kit for field reviews;
- proper safety equipment;
- a checklist for field review;
- pre-determined format for field review reports;
- pre-set notes of site meetings;
- timely response to all contractor requests, to avoid potential delays;
- timely review and processing of all shop drawings, samples or mock-ups;
- recognition and understanding of the roles of all participants in the project (avoid assuming issues or problems that do not fall within the architect's scope of work, otherwise the contractor will readily assign responsibility to the architect);
- adequate assessment of the contractor's application for payment (experienced

contract administrators will review the application with the contractor on the site before the application is finalized by the contractor);
- care in issuing the Certificate of Substantial Performance (once issued, these documents cannot be rescinded and they activate the timing for the release of holdback);
- impartiality between the client and the contractor;
- documentation of all communications, findings, and observations, in part to support future defence of any claim.

The Project: Post-construction

Most client-architect agreements provide for the termination of the agreement one year following the date of substantial performance. The architect should maintain contact with the owner and should bring critical or annoying warranty items to the contractor's attention promptly for rectification. Provide a list of warranty items for correction by the contractor, following a final on-site review scheduled shortly before expiry of the warranty period. Ensure that the critical date is logged in calendars or in a "bring-forward" system to avoid the risk of missing this final field review prior to the expiration of the warranty period. Refer also to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations*.

Projects in Other Jurisdictions

Architects working outside their base jurisdictions should learn about the differences in construction practices and professional services in other jurisdictions which may increase risks. The further from home, the greater the differences. Some differences to watch for include:

In other municipalities within the same province:

- different zoning, land-use, and other bylaws;
- different building code interpretation;
- different processes in applications to Authorities Having Jurisdiction;
- local customs.

In other provinces within Canada:

- different legislation (such as lien legislation);
- architectural registration/licensing and provincial policy with respect to seeking work in another province without a licence;
- applicable provincial law (for example: Civil Code in Québec vs. common law in other provinces);
- local customs;
- bylaws in specific municipalities.

Outside Canada:

- different laws:
  - whether the architect can legally provide services in the jurisdiction;
  - liability laws;
  - tax laws which may affect profitability;
  - laws respecting travel, visas, and freedom of movement;
  - international agreements and treaties;
  - applicable building codes;
- different customs:
  - cultural differences;
  - language which may govern contracts;
  - payments to "sponsors" for the privilege of working in the jurisdiction;
  - political alliances (allies, neutral parties, and enemies);
  - local trade practices;
- forms of contract:
  - standard international contracts, for example, the contract of the International Federation of Consulting Engineers (FIDIC);
  - uninsurable clauses such as guarantees, warranties, higher standards of performance than in Canada, greater indemnification of owner than Canadian architects are accustomed to (for example, the following are not insurable: major disasters, a major settlement of a lawsuit several years after project completion);
  - unusual clauses (for example: "if there is a discrepancy in the documents that which best suits the client will govern");
- payment:
  - make payment terms very clear;
  - be aware of exchange rate fluctuations if payment will be in a foreign currency;
  - make arrangements for transfer of funds before accepting the commission because many countries forbid local currency leaving the country;

    - be aware that some foreign jurisdictions require fees to be either held for performance holdbacks or guaranteed by letter of credit;
- other differences:
    - different time zones between the main office and the overseas location mean that there may be little or no time in which both offices are operating simultaneously;
    - increased communication costs;
    - collaboration — many foreign clients want to deal with a firm that has a strong local presence; this could entail an alliance with a foreign architectural practice, or the opening of an office in the jurisdiction, either of which will require review of the architect's status with both local and foreign associations, as well as with the professional liability insurer.

Definitions

Indemnification: Where one party agrees to pay certain damages or losses incurred by another party.

Liable: Legally bound; subject to penalty; under obligation to do; exposed or open to suffer something undesirable. (adapted from the *Oxford Dictionary*)

Risk: A chance or possibility of danger, loss, injury or other adverse consequences. (adapted from the *Oxford Dictionary*)

References

American Institute of Architects. Washington, D.C.
AIA Risk Management Resource Center
www.aia.org/pm_news_riskmgmt

Atkins, James B. and Grant A. Simpson. *Managing Project Risk: Best Practices for Architects and Related Professionals*. John Wiley & Sons, Inc., 2008.

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.
www.ccdc.org

CCDC Bulletins, notably:

Partnering. November 1998.

Alternate dispute resolution (ADR) processes. November 1998.

Consultant's role in ADR processes. November 1998.
Use of Supplementary Conditions with CCDC Standard Contract Forms. November 1998

ENCON Group Inc.
Loss Control Bulletins for Architects and Engineers
www.encon.ca/english/resources/losscontrolinformation/bulletins/pages/default.aspx

Ontario Association of Architects. Toronto.
www.oaa.on.ca/client/oaa/OAAHome.nsf/web/OAA+Practice+Bulletins!OpenDocument

Practice Bulletins, notably B Series — "Good Practice"

ProDemnity Insurance Company. Toronto.
www.oaa.on.ca/client/oaa/OAAHome.nsf/web/Pro-Demnity+Insurance?OpenDocument

ProDemnity Policy No. 1, 2, 3 and 4

Ordre des Architectes du Québec. Montréal.

Articles du Code civil d'intérêt particulier pour les architectes. 1993.

Articles of the Civil Code of Particular Interest to Architects. 1993.

Royal Architectural Institute of Canada (RAIC).

Guide to Using Consultants. RAIC Practice Builder. Ottawa, Ont.: RAIC.

Building Information Modeling (BIM). RAIC Practice Builder. Ottawa, Ont.: RAIC.

A Guide to Determining Appropriate Fees for the Services of an Architect. Ottawa, Ont.: RAIC.

Stone, David A.

Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives Inc., 1999.

Appendix A — Record Keeping

Introduction

The most valuable advice for managing any project that can be given to an architect is "*put it in writing*".

This statement applies equally to:
formal documentation used in the administration of a construction contract;
other forms of communication between the architect and client, subconsultants, manufacturers' representatives, Authorities Having Jurisdiction, bidders, general contractors and testing and inspection agencies.

Accurate, comprehensive records of all communications with everyone with whom the architect discusses any aspect of the project must be made and kept in a readily-retrievable filing system. A sample system is given in the Chart: A Project Filing Format, in Chapter 2.1.5, *Office Administration*. This may be adapted to suit the needs of each individual architectural practice.

Means of Communication

contractual:
Prequalification Advertisement as required
Prequalification Submissions as required
Bid Advertisement(s)
CCDC 11, Contractor's Qualification Statement as required
Bid Closing Date Extension Announcement as required
Addenda
Bids
Construction Contract
Supplemental Instructions
Change Orders
Change Directives
Certificates for Payment

other hard copy documents:
letters
memos
minutes of meetings:
these may be face-to-face meetings, telephone conference calls or video conferencing; in all cases, minutes are taken and issued, preferably within 48 hours of meeting, to all participants and other interested parties.

frequently hand-written:
transmittals for documents or for faxes.
memos
site instructions
desk diary

electronic:
faxes:-documents transmitted by fax remain in the office of origin and should be refiled with the fax transmittal attached or, a notation on the document stating that it was faxed, giving the date, time and recipient(s); received faxes may be printed automatically in hard copy or held in fax machine until printed in hard copy or downloaded to an electronic file.
e-mails

oral:
voice mail
face-to-face communications
telephone

Record Keeping

Record everything in writing, **dated** and filed in an orderly, readily-retrievable system.

In specific circumstances, the **time** a document is issued or received may also be significant, such as: issuing the last addendum just prior to the deadline identified in the Instructions to Bidders; receiving bids at the architect's office;

Most fax machines and e-mail automatically record the time; however, if hand-written transmittals are used, time of issue or pickup should be recorded. A request for acknowledgment may be desirable for key issues.

Concise, written summaries of all voice mail messages, telephone and face-to-face conversations should be prepared as soon as possible and filed.

For ease of retrieval, use the same filing system format for hard-copy and electronic material. Generally, every e-mail sent or received should be filed. The only exception might be a series of e-mail exchanges leading up to a conclusion/instruction/confirmation. In this case only, it may be logical to retain only the original enquiry and the final resolution; if there is any doubt about whether an intermediate e-mail might become relevant in future, keep it.

Electronic records are more vulnerable to loss than hard-copy, therefore it is essential that backup files are routinely and rigorously created, preferably each time a document is created or received. Make duplicate backup files and store them off-site.

GO NO-GO Checklist to Assess the Degree of Risk

Issue	Yes	No	Don't Know	Comment
A. Adherence to Marketing Plan				
1) Does the project meet our design objectives/goals?				
2) Does the project match our target markets as defined in our marketing and business plan?				
3) Does the project match our target services?				
4) Is the project within our geographic reach?				
5) Is the project consistent with our minimum/maximum project size objectives?				
6) Does the project present us with an unusual opportunity to break into a new market that we had not foreseen?				
7) Does the project offer repeat client potentials?				
8) If we get this job, will it preclude us from further work with this client?				
B. Profit Potential				
1) Can we make a profit doing this job?				
2) Are there any prevailing reasons to want the job, even though we cannot make money on it?				
C. Project Financing				
1) Are project funds secured?				
2) Is it likely they will be?				
3) If not, will funds be secured before we complete working drawings?				
4) Is the client experienced or inexperienced in contracting design services?				
5) Is there a discrepancy between the proposed scope of services and the fee?				
6) Is the fee adequate?				
7) Can we propose a competitive fee?				
8) Are there other factors that negatively affect the project's viability?				
9) Is the client's financial and general reputation good?				
10) Is the project free of speculative aspects?				
D. Architect Selection Process				
1) Is the selection process reasonable?				
2) Is the job "wired" to another firm?				
3) Can we compete effectively under the conditions of the selection process?				

Issue	Yes	No	Don't Know	Comment
E. Location				
1) Is our location favourable in terms of the client's criteria?				
F. Human Resources				
1) Do we have the available human resources to produce the work in the client's time frame?				
G. Marketing / Staff				
1) Do we have the staff and time available to pursue this project in a first-class fashion?				
H. Client Contact				
1) Are we known by the client?				
2) Is it a past client with whom we have had a good reputation?				
3) Have we become known to the prospect?				
4) Will we have adequate opportunity to research the client's needs before the marketing process begins?				
5) Do we have any inside tracks with the primary decision-maker?				
6) Do we have any inside tracks with others who are or may be influential in the decision?				
I. Competition				
1) Do we know the likely competition? (identify)				
2) Do we have a chance against them?				
3) Does this project offer us an opportunity to compete at a "higher level" against firms with whom we would like to be identified in the marketplace?				
J. Message				
1) Do we have a strong message?				
2) Are we uniquely qualified to do the job? (identify)				
3) Can we compete effectively?				
K. Making the Short List				
1) Are our odds of being shortlisted good? (explain)				
2) Are our odds good if/when we make the shortlist? (explain)				
L. Cost to Pursue				
1) Will marketing time and effort required be in proportion to our odds?				
2) Will the marketing costs be relative to the potential profit? (Spending our profit to get the job may be sufficient reason to decline.)				
M. Other				
1) Are there specific requirements that we will have difficulty in accommodating? Such as:				
a) Insurance requirements?				
b) Copyright assignment?				
c) Engagement of specialty consultants?				
d) Guarantees?				

Checklist: Issues to Consider When Assembling the Consulting Team

Issue	Yes	No	Don't Know	Comment
1. Are the professionals with previous relevant experience still with the engineering consulting firm, and will they be assigned to this project?				
2. Does the client know the proposed engineering consultant?				
3. Will the client object to the use of this consultant?				
4. Does the consultant have experience in this project type and this client type?				
5. Does the consultant have prior working experience with your practice?				
6. Does this consultant have prior working experience with the other proposed consultants?				
7. Was prior working experience with this consultant positive?				
8. Is the consultant's proposed fee competitive?				
9. Does the consultant have any conflicts of interest on this project or with this client — either actual or perceived?				
10. Do the consultants all carry professional liability insurance to the limits required for this project?				

Chart: Comparison of Statutes of Limitations in Each Province and Territory

The limitation period to bring an action relating to negligent architectural services varies from province to province and with the type of damage that results. The basic rule is that the limitation period starts to run from the date the cause of action arose. Usually, this occurs when the party suffering the loss discovers, or ought to have discovered, that it had the right to sue for damages and knows the identity of the person/entity it can sue. The damage may not be discovered for many years after the construction is complete (for example, precast concrete panels may fall off after incorrectly specified anchors have rusted or corroded and failed).

The following chart sets out the appropriate limitation periods according to whether the action is one in contract or tort (that is, negligence) and whether the damage is to property or person.

This is a very general outline only and does not replace proper advice, from professional liability insurers and lawyers, which should be obtained as soon as possible in the event of a potential claim.

Province	Limitation Period (Number of Years)	Relevant Legislation
British Columbia	• Negligent design and/or construction or breach of contract causing damage or injury to person or to property: 2 years • Time will be postponed if the action is for fraud or breach of trust	*Limitations Act,* R.S.B.C. 1996 ss.3(2)(a), (5), 6(3)
Alberta	• Negligent design and/or construction and breach of contract - 2 years after the date on which the claimant knew, or in the circumstances ought to have known of the claim; or -10 years after the claim arose; whichever period expires first.	*Limitations Act,* R.S.A. R.S.A. 2000, c.L-12, s.3.
Saskatchewan	• Negligent design and/or construction: 2 years causing injury to a person: 2 years • Breach of contract: 2 years	*The Limitations Act,* Chapter L-16.1 of *The Statutes of Saskatchewan*, 2004 (effective May 1, 2005), as amended by the *Statutes* of Saskatchewan, 2007, c.28.
Manitoba	• Negligent design and/or construction causing: Injury to real property: 6 years Injury to personal property: 2 years Injury to a person: 2 years • Breach of contract: 6 years	*Limitations of Actions Act,* L.R.M. 1987, s.2(1)(f),(g),(i),(n)
Ontario	• Negligent design and/or construction: 2 years • Breach of contract: 2 years • 15 years is the ultimate limitation period (Schedule B S15(2)) for both negligent design or breach of contract.	*Limitations Act,* 2002, S.O. 2002
Québec	• Negligent design and/or construction: if the work was completed: 8 years if not completed: 3 years • Breach of contract: 3 years	*Civil Code of Quebec* Art. 2925, 2118
New Brunswick	• Negligent design and/or construction: 6 years • Breach of contract: 6 years	*Limitation of Actions Act,* S.N. 1997, c.L8, s.9
Nova Scotia	• Negligent design and/or construction: 6 years • Breach of contract: 6 years	*Limitations of Actions Act,* R.S.N.S. 1989, c.258, s.2(1)(e)
Prince Edward Island	• Negligent design and/or construction: 2 years • Breach of contract: 6 years	*Architects Act,* S.P.E.I. 1990, c.4, s.34 & *Statute of Limitations Act,* R.S.P.E.I., 1988, c.S-7, s.2(1)(g)
Newfoundland and Labrador	Breach of contract and/or professional negligence in design and/or construction causing injury to person or property: 2 years; -other breaches of contract: 6 years	*Limitations Act,* S.N.L. 1995, c. L-16.1, ss, 5(a), 6(1)9c), 9
Northwest Territories	• Negligent design and/or construction causing: Injury to real property: 6 years; Injury to personal property: 6 years; Injury to a person: 2 years	*Limitation of Action Act* R.S.N.W.T. 1988,c.8(Supp.) In force July 19, 1993; SI-008-93



2.1 Management of the Practice

2.1.10 Architectural Services and Fees

Canadian Handbook of Practice for Architects

Introduction

The Architect's Traditional Services
- Basic and Additional Services
- Identification of Services

The Architect's Fee
- Methods of Compensation
- Fee Calculation

Trends in Architectural Services
- Requests For Proposals

Client-Architect Agreements

Definitions

References

Appendix A – the Architect as Expert Witness

Checklist: Scope of Services

Checklist: Supplemental Architectural Services

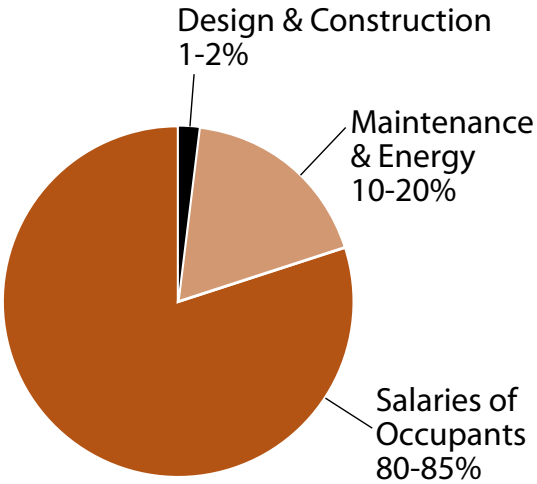
Architectural Services and Fees

Introduction

Architecture is a rapidly changing, knowledge-based, service industry. As a result, providing and determining compensation for architectural services is more challenging than ever. This chapter will help architects meet the challenge by discussing how to identify appropriate services for their clients and how to set a value for those services.

Architects need to educate clients about the value of architectural services and how an architect's ideas and knowledge can result in significant increases to the real estate or commercial value of a building as well as savings in the building's operating and maintenance costs. Refer to Illustration 1 which illustrates that the architect's fees are indeed a very small fraction of the total costs for constructing and owning a building. This important upfront investment in professional services can have very significant impacts on future costs.

Illustration 1: Costs of Constructing, Owning and Operating a Building



The Architect's Traditional Services

Before an agreement (or interim agreement) is prepared and before beginning work on a project, the architect must propose an appropriate complement of services to the prospective client. The services should be based on the project requirements, the client's own in-house competencies and the architect's capabilities. Because the architect is required to provide an appropriate level of professional services, fees must be adequate to enable and ensure that this level is maintained.

Basic and Additional Services

Traditionally, architectural services were limited to the design and construction administration of buildings, a fact reflected in the following five sequential phases of a project:

- Schematic Design;
- Design Development;
- Construction Documents;
- Bidding and Negotiation;
- Construction Phase (Contract Administration).

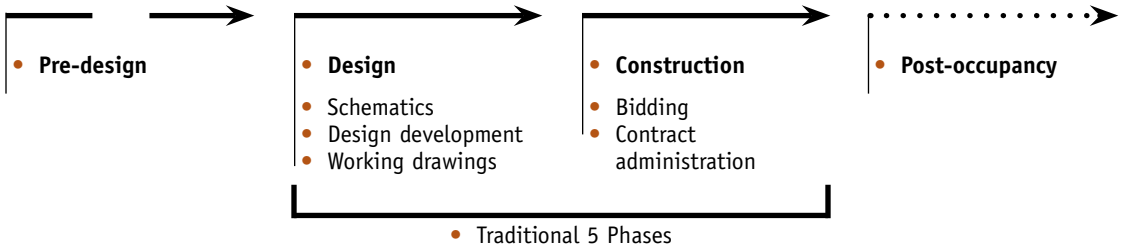
Refer to the *Canadian Standard Form of Agreement Between Client and Architect: Document Six* and to several of the chapters in Section 2.3, *Management of the Project*, for a full outline of architectural services contemplated for each phase.

These five phases have become so entrenched that they are used in all of the Canadian standard forms of agreement between the client and the architect.

Basic services are those services the client and the architect have agreed are necessary for the implementation of the project.

These services, organized by project phase, are listed in the "Checklist: Scope of Services" at the end of this chapter.

Illustration 2: Linear ("Basic Services") View



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The profession is aware that many clients require additional services beyond the basic services and, in a few circumstances, certain clients may not require parts of the traditional "basic" services. This has resulted in a larger menu of services described in the various schedules attached to the standard client-architect agreements.

Refer to the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six* and to several of the chapters in Section 2.3, Management of the Project, for a full outline of architectural services contemplated for each phase.

Additional services (as defined in the Definitions and General Conditions of RAIC Document Six) are:

> "those professional services which are not contemplated at the time of execution of the contract and therefore cannot be identified then as being included in the contract but which with the written consent of the Client and Architect are subsequently added to, or which adjust, the scheduled scope of services outlined in the schedule(s) listed in the contract."

Fees for additional services are frequently invoiced on the basis of agreed hourly rates.

Understanding the full breadth and value of services that could benefit a client can create opportunities for additional and supplemental services on a project, and identify new markets.

The Checklist: Supplemental Architectural Services at the end of this chapter identifies many types of services that cover a broad range of expertise and activity — such as providing financial feasibility studies, business cases and preparing functional programs, submissions to authorities, and life cycle cost studies. Clients are often unaware of, or choose to ignore, the distinction between traditional architectural services and other related professional work. Architects who also ignore this distinction may not be receiving full value for their efforts, and may be providing additional services on a *pro bono* basis for a significant segment of their market.

Practices may wish to prepare a briefing document to outline the types of services for which the firm has expertise that can be supplied to prospective clients.

Identification of Services

The success of a project depends on the proper identification of services. At the outset, the architect — together with the client — must determine the professional services required for the project. Once this is done, the architect can prepare a proposal of fees and services and negotiate an agreement with the client.

Occasionally, the required services cannot be identified at the outset of the project. For example, the site may not be selected, or a functional program may not have been prepared. In these instances, it is prudent to work on a per diem basis, until the project is better defined.

To identify required services, prepare a list of tasks to be performed and a time frame for each. The process also involves identifying and selecting engineers and other consultants necessary for the project. The services outlined in the standard forms of agreement can serve as a checklist or "menu" for selecting the appropriate services.

The Architect's Fee

In addition to the RAIC document, *A Guideline to Determining Appropriate Fees for the Services of an Architect*, the architect should obtain the latest fee schedule, tariff of fees, and conditions of engagement from the appropriate provincial or territorial association of architects.

See the References section of this chapter for a list of these documents.

Methods of Compensation

Both parties — architect and client — will benefit if the architect receives adequate compensation for the professional services provided. Compensation is usually by one of the following methods:

- percentage (of the construction cost);
- time basis (per diem or hourly rates);
- lump sum (or fixed fee); or
- any combination of the above.

Occasionally, in some provinces, architects are paid on a unit basis for projects such as multiple-unit housing or hotels, which have a repetitive element. Unit fee determinations are frequently arbitrary and do not relate to the nature and scope of architectural services.

The standard forms of contract have been crafted to accept different approaches to compensation. *Construction cost* has been clearly defined in the agreements. Fees should never be confused with *reimbursable expenses* (sometimes called disbursements) which are also clearly defined in the agreements.

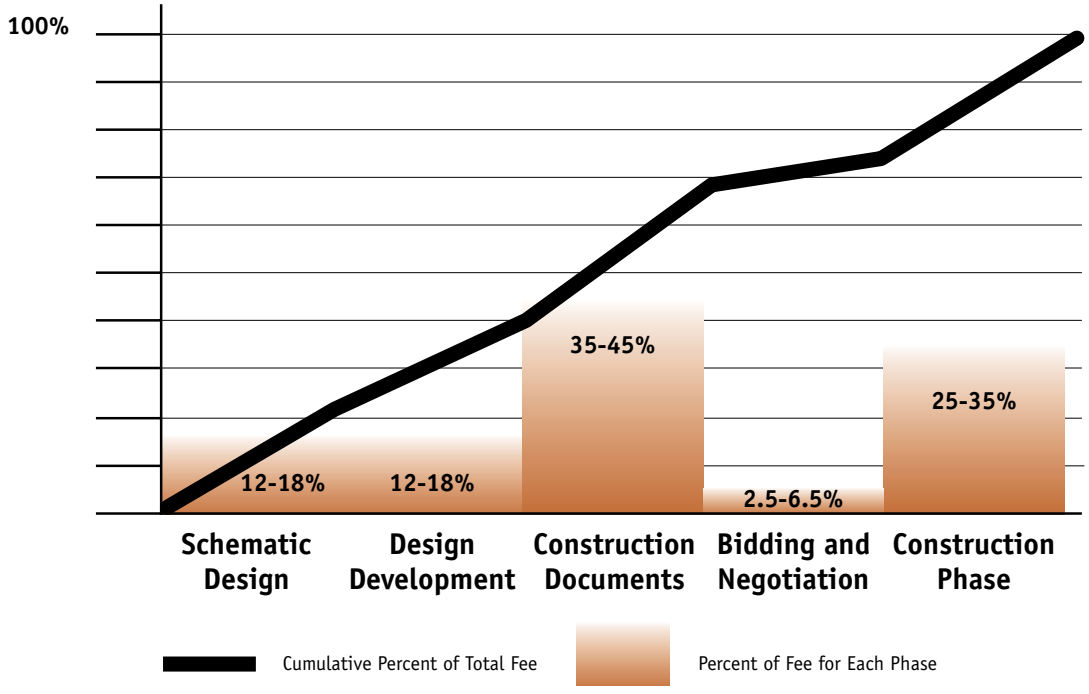
Fee Calculation

Refer also to Chapter 2.1.4, *Financial Management*.

When calculating the distribution of the fee over the traditional five phases of a project, the following breakdown is typical:

Phase	% of total fee
Schematic Design	12-18
Design Development	12-18
Construction Documents	35-45
Bidding and Negotiation	2.5-6.5
Construction Phase (Contract Administration)	25-35

Illustration 3: Typical Allocation of Fees for a "Traditional" Architectural Project



In new forms of project design and documentation, such as Building Information Modeling or BIM, more design and documentation is completed during the earlier phases of a project. As a result it is not uncommon for the phased breakdown of fees on projects using BIM to resemble the following:

Schematic Design	25% of the fee
Design Development	25% of the fee
Construction Documentation	25% of the fee.

Typically, services are rendered and payments are made progressively, with final accounting (100% of total fee) at Substantial Performance of the construction or after the preparation of the final Certificate for Payment to the contractor.

The three usual methods of compensation use the following methods of fee calculation:

Percentage of the Construction Cost
Architects should base their fees on the recommended schedules prepared by the RAIC in *A Guideline to Determining Appropriate Fees for the Services of an Architect*, or schedules developed by the provincial or territorial associations of architects. Obtain the most current schedule available, as they are occasionally updated.

Percentage fees are, to a certain extent, contingent on the size and type of project as well as the scope of services required. For example, the schedules generally recommend:

- lower percentages for simple buildings or buildings with a higher construction cost;
- higher percentages for buildings which are more complex or have a lower construction cost.

The percentage fee provides a base fee, which must be adjusted depending on the scope of services and other fee adjustment factors outlined in A *Guideline to Determining Appropriate Fees for the Services of an Architect*. By applying the fee to a known cost or approved estimate at the start of each project phase, the fee can be accurately determined and both the client and the architect can budget accordingly.

The recommended base percentage fees anticipate the following project conditions:

- the architect is providing full, basic services (traditional approach);
- the project is a unique, one of a kind design for a single client who can clearly define the function and scope;
- approvals from Authorities Having Jurisdiction are relatively straight forward;
- the project will be tendered once, as a single, coordinated package of construction documents;
- the method of project delivery is the use of a Stipulated Sum Contract (such as CCDC 2);
- the project size is not extreme (neither very large nor very small);
- the project approvals are simple and straightforward;
- consultants are limited to those providing the three basic engineering services;
- there are no delays, or the progress of the project is not intermittent (thereby incurring repetitive "start-up" costs);
- the percentage fee is calculated at each phase as a percentage of the construction cost as defined in the agreement.

In the provincial or territorial fee guidelines, percentage fees usually include the fees of structural, mechanical, and electrical engineers — the three common engineering disciplines. And in some jurisdictions, "net percentage fees" are occasionally used, which exclude the provision of engineering services. This is sometimes the case in multiple-unit housing projects. This method can also be used when the architect is engaged under separate agreement, with the client engaging the engineers directly and the architect providing coordination services.

In the RAIC guideline there are two charts – one with percentage fees which include basic engineering (structural, mechanical and electrical engineering only) and one with percentage fees without basic engineering services. Other specialist consultants are not included in the percentage fee.

In all cases, ensure that sufficient fees are allocated for complete coordination. All tariffs or or fee schedules usually include coordination services in the net percentage provided.

However, the architect should verify this and compare the suggested percentage with the actual coordination requirements and the team composition. Architects can use the following rule of thumb: the cost to the architect for coordinating engineering consultants is approximately 25% to 35% of the engineering fee. Engineering services can also be negotiated as a percentage of the total construction cost to avoid disagreement over the amount to which the percentage is applied.

To ensure the validity of the amount, use the percentage fee method as a check when calculating a fixed fee (lump sum) quotation.

Refer also to the RAIC document, *A Guideline to Determining Appropriate Fees for the Services of an Architect*.

Time Basis (per diem and hourly rates)
A per diem or hourly rate is often the most appropriate method for establishing a fee, especially in the early stages of a project. Some other situations when this approach would be appropriate include:

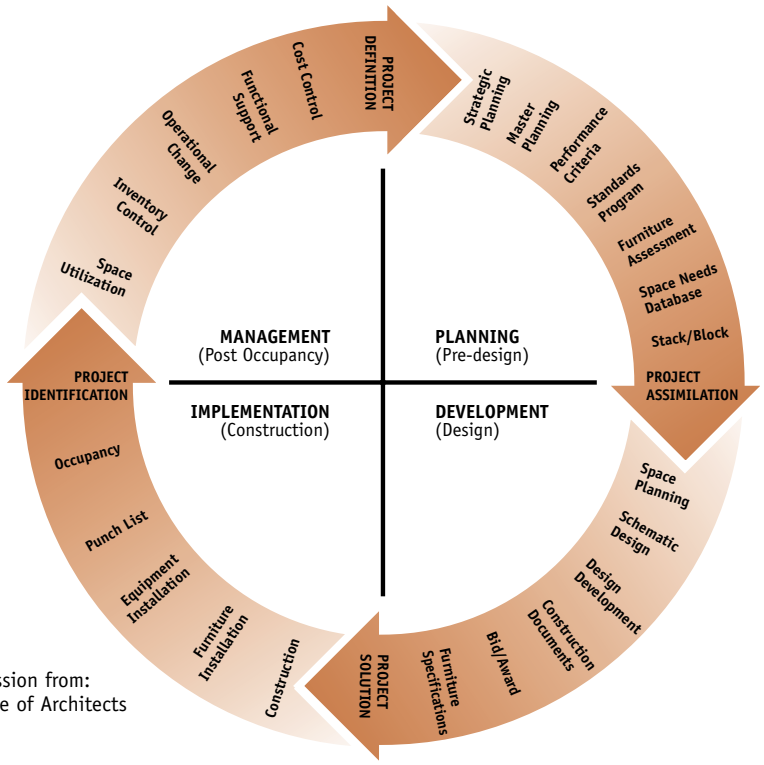
- pre-approved work being changed;
- small projects;
- pre-design or other types of feasibility studies;
- undefined scope of services;
- intermittent work or services.

Per diem or hourly rates are usually determined by the following:

- a multiplier of direct personnel expense [payroll cost (+) payroll burden (x) a multiplier];
- existing market conditions.

Traditionally, provincial associations have recommended higher per diem rates for special expertise such as acting as an expert witness or providing a unique or highly specialized service.

Illustration 4: The Client Support Circle



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Lump Sum or Fixed Fee
To use the fixed fee basis, both the client and the architect must thoroughly understand and agree on all tasks required and on the project schedule. The method also requires calculating all costs and making a comparison with the two other methods of compensation. Refer to Form 2.2, "Fee Calculation Sheet," provided in Chapter 2.2, *Sample Forms for the Management of the Practice*. When preparing a fixed fee quotation, include the following:

- all direct and indirect labour costs;
- all expenses, including materials;
- overhead and profit;
- risk factors involved with this client and this project;
- consultant costs;
- costs for coordination of consultants;
- marketing costs;
- a contingency.

Double-check the fee proposal and do a "reality check" based on market conditions by:

- determining fees as though they were based on a percentage of anticipated construction costs;
- re-calculating the costs to provide the fees very conservatively, using a worst-case scenario;
- checking the staff utilization rates and profit history of similar projects;
- ensuring that staff or partners double-check or independently verify the fee calculation.

With clear parameters, including a well-defined scope of services and construction estimate and project quality, the fixed fee can be a satisfactory approach for both the client and the architect. However, when unknown factors or an ill-defined project are involved, the fixed fee method can cause strained relationships and lead to substantial losses for the architect. Verify that all agreements include provision for determining the fee for:

- changes in scope;
- preparation of Change Orders;
- time delays (caused by the owner or contractor).

Trends in Architectural Services

Today, the architect often provides services in a different manner, including any combination of the following:

- partial services (where the requirement for basic services is more limited);
- expanded services (new services not previously offered, such as facility management and 3-D computer models and BIM);
- services through different project delivery methods (refer to Chapter 2.3.2, *Types of Construction Project Delivery*).

Different project delivery methods can mean an increase in both the scope of services and liabilities; therefore, the fee must be adjusted accordingly.

The scope of services varies for *each* project, *each* client, and *each* form of project delivery. As a result, it is now more common for architects and clients to identify services from a "menu" or "shopping list." This flexible approach is now recognized by the various different Schedules which must be appended to *Canadian Standard Form of Contract for Architectural Services – RAIC Document Six*. The American Institute of Architects (AIA) basic agreement, B141, recognize this reality. The AIA document, which views architectural services as a continuum in the life of a facility, groups the services as part of the following four stages:

- Planning or Pre-design;
- Development or Design;
- Implementation or Construction;
- Management or Post-occupancy.

(Refer to Illustration 4.)

This arrangement expands the possibility of architectural involvement beyond the "traditional" phases of a project. Some of these expanded, non-traditional services are outlined in "Checklist: Supplemental Architectural Services," at the end of this chapter.

Requests For Proposals

As requirements for professional services continue to change, so will the methods for engaging design professionals.

In seeking competitive submissions from architects, clients frequently use requests for proposals (RFPs) as a method of selecting architects. In responding to an RFP, the architect must carefully evaluate all conditions within the terms of reference to ensure that the architect will not be bound to provide services for which the architect is not competent or willing to provide.

Some RFPs outline a minimum "scope of services" but permit the proponent to offer additional services. Too frequently, RFPs are evaluated primarily or totally on the fee for professional services, without careful analysis and understanding of the full scope of services offered by the proponent. The architect must clarify and understand thoroughly the level of professional services required before providing a fee proposal.

RFPs can sometimes be ambiguous and provide incomplete descriptions of the project and the scope of services required; or, they describe the required services and terms and conditions as if the architect were a contractor or supplier of goods and not a service provider. Such RFPs should be questioned because client expectations for unrealistic scope of services, certain contractual obligations, and their subsequent consequences can be very detrimental to the project and to the practice. In some instances, the terms and conditions required from the RFP may not be insurable under professional liability insurance policies. Architects should encourage owners to change and improve such request for proposals or ask the architectural licensing authorities or the RAIC to intervene. If improvements are not made, architects should consider not responding to the RFP.

Refer also to the Checklist and Guidelines: Issuing Requests for Proposals (RFPs) at the end of Chapter 1.2.2., *The Client*.

Client-Architect Agreements

Regardless of the type of project, the architect should prepare and execute a written agreement with the client after identifying the full scope of services and negotiating a fee.

In British Columbia, written agreements are required by the Architectural Institute of British Columbia (AIBC).

It may be advisable to use an interim agreement or "binder" in order to start work while a full agreement is being prepared. The RAIC and some provincial associations have a single-page or short form agreement suitable for this purpose.

Architects should not use customized stand-alone agreements developed for the specific use of their own architectural practice. They stand to gain from promoting and adopting the Canadian standard forms of agreement between the client and the architect. These are produced by the architectural profession and accepted nationally. Furthermore, there is broad consensus on the meaning of the "General Conditions," and a certain amount of case law has been built up in their interpretation. These agreements are also consistent with CCDC contracts.

The guides contained with each of the standard contracts explain the use of the contracts and their terms as well as how to complete the forms. These contracts are:

- *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six;*
- *Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: RAIC Document Seven.*
- *Short Form Agreement Between Client and Architect — RAIC Document Eight.*

Definitions

***Construction Cost*:** Construction Cost is the contract price(s) of all Project elements designed or specified by, or on behalf of, or as a result of, the coordination by the Architect, including cash allowances, building permit fees, changes, construction management fees or other fees for the coordination and procurement of construction services, and all applicable taxes, including the full amount of value-added taxes, whether recoverable or not. Where there is no contract price for all or part of the Project, the Construction Cost shall be the estimate of probable cost of construction as determined by the Architect, or as agreed by the Architect if a Cost Consultant is engaged, at market rates at the anticipated time of construction. Construction Cost excludes the following:

- the compensation of the Architect and the Consultants,
- other professional fees which are the responsibility of the Client,
- the land cost, and land development charges.

In the event that the Client furnishes labour or material below market cost, or recycled materials are used, the Construction Cost for purposes of establishing the Architect's and Consultants' fees includes the cost of all materials and labour necessary to complete the Work as if all materials had been new and as if all labour had been paid for at market prices at the time of construction or, in the event that the construction does not proceed, at existing market prices at the anticipated time of construction.
***Fee*:** The amount of compensation paid to the architect for the provision of specific services. Reimbursable expenses or disbursements are not included.

Fixed Fee or ***Lump Sum*** or ***Stipulated Price*:** One stated sum of money for the performance or provision of specific services.

***Percentage Fee*:** A method of compensation which links the fee for architectural services to a percentage of the construction cost of the project. The percentage will vary depending on the type of building, the construction value, and the type of construction contract.

***Per Diem*:** Allowance or payment for each day.

***Service*:** Work performed, or the doing of work on behalf of an employer or client; benefit conferred, or exertion made, on behalf of someone; work comprised in whole or in part of labour, advice or supervision.

References

Royal Architectural Institute of Canada. *www.raic.org*

A Guide to Determining Appropriate Fees for the Services of an Architect.

Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six.

Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: RAIC Document Seven.

Short Form Agreement Between Client and Architect – RAIC Document Eight.

The American Institute of Architects (AIA). *The Architect's Handbook of Professional Practice.* 14th edition, Hoboken N.J.: John Wiley & Sons.

Provincial and Territorial Associations' Schedule of Fees or Tariff of Fees.

Architectural Institute of British Columbia. *Tariff of Fees for Architectural Services*. Revision #2 March 2004 *www.aibc.ca/member_resources/doc_index/tariff_of_fees/tariffoffees.PDF*

Alberta Association of Architects and the Association of Professional Engineers, Geologists and Geophysicists of Alberta. *Recommended Conditions of Engagement and Schedule of Professional Fees for Building Projects*.

Saskatchewan Association of Architects. *Bylaws of the Saskatchewan Association of Architects*, August 1997. Refer to Bylaw No. 16, 17, 18, 19, 20, 21, 22, 23, 24, and 25.

Manitoba Association of Architects. *Schedule of Suggested Professional Charges*. 1990.

Ontario Association of Architects. *A Client's Guide to Engaging an Architect in Ontario*, First edition, 2008

Association of Architects in Private Practice of Quebec/Association des architectes en pratique privée du Québec.

Architects' Tariff: The services, responsibilities and fees of the architect. January 2001.

Contrat entre maître d'ouvrage et architecte. Janaury 2001.

Agreement between Client and Architect. January 2001.

Architects' Association of New Brunswick. *Schedule of Recommended Fees.* March 1, 1993.

Architects Association of Prince Edward Island. *Conditions of Engagement and Suggested Schedule Minimum Professional Charges*. Latest edition.

Nova Scotia Association of Architects. *Conditions of Engagement and Schedule of Minimum Professional Charges*. Latest edition.

Newfoundland Association of Architects and Association of Professional Engineers and Geoscientists of Newfoundland. *Guidelines and Recommended Minimum Fees for Architectural and Engineering Projects*. March 2003

Stone, David A.

Mastering the Business of Architecture. (Ontario title only.) Toronto, Ont.: Ontario Association of Architects, 1999.

Mastering the Business of Design. Charlotte, NC: Impact Initiatives Inc., 1999.

Appendix A - The Architect as Expert Witness

by Bernie McGarva and Cleo C. Kirkland

Introduction

There are two principal circumstances in which an architect will be called upon to testify as a witness at a trial or before a hearing. In the first, the case will involve a project for which the architect has provided services. In the second category, the case will involve a project from which the architect is entirely independent and previously uninvolved. This article will discuss the proper conduct of an architect as a witness in both circumstances.

The Architect as a Witness in a Case Involving a Project for Which He/She Previously Rendered Services

Frequently, an architect will be asked by a client to appear as a witness in a case arising out of a project in which the architect provided professional services. For example, the client may be involved in a dispute with a contractor or other consultant. Alternatively, the client may find itself embroiled in a claim brought by a third party, as in the case of a personal injury sustained on the premises of the project. **In all cases where an architect is contacted to act as witness in a case involving a project where he/she previously or is currently rendering services, the architect must contact his professional errors and omissions insurer to inform the insurer and to obtain guidance.**

All too frequently, these sorts of cases involving clients and others lead to future cases involving the architect. For instance, if an unfavourable outcome occurs in a given case, a client may look to the architect to compensate him for the costs or damages which have been sustained in the first case. This is why it is critical that an architect contact his insurer.

Sometimes an architect will be asked or summoned to testify by a party other than the client. The architect is under no legal obligation to speak to a party or a lawyer representing a party other than his client. However, if summoned, the architect will be under a legal obligation to appear in court or before the relevant tribunal.

Regardless of who has asked the architect to testify (be it the client or another party), in providing evidence in this sort of case, the architect should remember to testify in a manner which is complete and even-handed. The architect should not confuse his role with that of an advocate. While the architect has specialized skills and may testify about matters in which he/she is an expert, this does not mean that the architect's role is to promote the client's case.

It is important to understand that a summons (also known as a subpoena), is a legal document requiring the attendance of the person who is named to attend to testify in a court or before a tribunal. A summons, in almost all cases, requires the witness to bring relevant documents to court. A summons requires the attendance of the individual on a particular date and at a particular time. It may have been issued at the instance of any party to a proceeding (and as indicated above, not necessarily the architect's former or current client). In all cases where an architect has been summoned, or simply requested to testify by a party, **the architect must contact his insurer.**

It may seem unusual that an architect could be summoned or compelled to testify by someone with whom the architect has had no previous contractual relationship. However, this does occur from time to time. The fact that a stranger may have summoned the architect to testify does not end the architect's obligations and loyalties to his client. Those obligations however, can never override the architect's obligations to give evidence in a truthful, complete and even-handed manner.

An architect may be called not only to appear as a witness, but also to spend time preparing for the hearing, in consultation with the client, or with the client's solicitor. This should be considered to be extra work, and fees should be discussed and agreed upon before the work is undertaken.

An architect may be asked to prepare a detailed report for a client, or for the client's solicitors. Once again, this is generally considered to an additional service and the nature and extent of fees or remuneration should be discussed and agreed upon before the work is started.

Architects Called to Testify as Independent Experts

From time to time, an architect will be asked to testify as an expert witness in a case involving a project with which the architect has had no previous involvement. In such a case, it is expected that the architect is chosen to reflect the special expertise which he/she brings to bear on a particular issue or set of issues to be decided by the court or tribunal. In these situations, the architect's point of contact is frequently the lawyer of the party retaining the architect.

Since the architect was not previously involved in the project, he/she will have to rely upon the evidence which is put before him. The architect may find that he/she has been called upon to testify in these circumstances by an owner, by another architect, by another consultant, or by a third party. An independent architect expert is entitled to act for any of the above groups, and in all cases, is presumed to bring to the case expertise in an issue which is relevant to the court or tribunal and complete independence from any of the parties involved. Accordingly, it may be inappropriate for an architect to provide expert evidence for a close friend or relative. Such evidence would be tainted by the personal relationship involved and the architect's ability to provide independent evidence would be brought into question.

As in the case of architects who are called upon to testify in respect of their own projects, it remains the case that an independent expert architect must also testify in a balanced and even-handed way. Although called upon to support the case of a particular party, this does not thrust the architect into the role as advocate for that party. Experts who see themselves as advocates usually find their evidence met with suspicion and scepticism on the part of not only opposing parties, but the court or tribunal hearing the case. Keep in mind that the client and the client's lawyer want to know the problems and pitfalls of their case as well as the positives. The expert architect is uniquely positioned to assist in providing a balanced approach.

In some cases, an architect will be called upon to simply provide background advice to a lawyer on a construction matter. The architect may find himself giving the lawyer a summary course in a particular subject (for instance, "Roofing 101"). The architect may be asked to attend a trial or a hearing and observe evidence from certain witnesses and provide feedback to the lawyer for cross-examination. In this more limited role, the architect does not perform the full services of an expert witness. However, the architect's expertise and balanced approach is nonetheless called for.

Possible Appearances for the Architect as Witness

There are many different situations in which architects may find their witness services required. A partial listing of those situations is given below.

I. The Courts of Law

In most provinces, architects could appear in Small Claims Court, Provincial Court (Criminal Division) or a Superior Court of Justice.

II. Public Tribunals

Public hearings are conducted by boards and commissions constituted under municipal by-laws and provincial or federal statutes. Their purpose is to determine the rights of individuals under the particular by-law or statute under which the board or commission was established. Examples of such ongoing tribunals include the Ontario Municipal Board, the Environmental Assessment Board and the Atomic Energy Control Board.

III. Judicial Inquests

The terms of the provincial legislation regarding public enquiries (such as the *Public Enquiries Act* in Ontario) enable the provincial governments to establish commissions that will hold public hearings into particular matters arising from, or concerning, provincial statutes. The objective of these hearings is to establish the true facts of the situation; no finding of guilt is made.

IV. Royal Commissions

A Royal Commission is constituted for the purpose of conducting a public inquiry into a specific matter or circumstance. Ordinarily, participants will prepare a formal statement to the Royal Commission and submit it before the hearing. Appearances before such bodies are usually brief. Witnesses confine their remarks to one or two of the instances covered in the formal brief and their availability for questioning.

V. Coroner's Inquests

Coroner's inquests are not intended to determine guilt but to establish a fact or facts. Procedures are similar to those used in the courtroom, although a more informal approach usually exists. Architects are expected to exhibit conduct identical to that exhibited when appearing in court.

VI. Arbitrations

There are many types of arbitrations. Comments on courtroom procedure apply in principle, but must be modified to suit the particular circumstances and the dictates of the particular arbitration.

VII. Professional Disciplinary Hearings

Under the various provincial *Architects Acts*, a Discipline Committee or Conduct Committee, may conduct hearings into the manner and the quality of a member's practice and personal conduct. Procedures are similar to those in a courtroom, but architects are usually allowed somewhat greater latitude in conducting their defence than in a court of law. In the context of a disciplinary hearing, architects acting as expert witnesses can act for either the prosecution or the defence, in a given hearing.

Accepting an Assignment

The following quote from RIBA's Practice Management Handbook is helpful:

> *"Architects are sometimes approached to act as expert witnesses. This is highly specialized work, not to be undertaken lightly. Years can elapse before a case goes to court and, once underway, the expert witness is expected to put aside all normal work commitments and engagements and put him or herself at the court's disposal – often for a lengthy period. This will inevitably have disruptive effect on both personal and practice commitments.*
>
> *Expert witnessing is exacting work: lawyers expect expert witnesses to stand up to hostile cross-examination and then to be able to think on their feet. To have credibility in the eyes of the court, the reports of an expert witness must be patently impartial and objective, whichever side has commissioned them."*

Before agreeing to accept an assignment that may involve legal procedures, architects should first be fully satisfied with several important issues.

I. Competence

Competence is a "quality of having suitable skill, knowledge or experience for some purpose". It is a dynamic quality that relates to the present task, assignment or activity. Architects should assess their competence by determining that their theoretical knowledge, practical experience and reputation in their field are of a suitable extent and depth to enable them to put forward and to defend a position that would be useful for the client and credible to the court. Judges place considerable weight on the experience of expert witnesses. This is not to say that age will in all cases triumph over youth. However,

a Judge will carefully consider past relevant experience in similar projects in assessing the credibility and weight to be given to the expert's evidence.

II. Conflict of Interest

Architects should examine their personal involvement in the affairs of any of the parties to the action or the inquiry, to ensure that they have no conflict of interest. The architect should also examine any relationships with other clients who are not directly involved, and make certain that participation in the action or inquiry will not result in a disadvantage to them. Architects in large firms will find that conflicts may abound. The party seeking to retain the architect may be acting adversely to an existing or former client of the firm. Similarly, in smaller communities, personal conflicts will also be frequent. All too often the party whom you are asked to testify against will turn out to be a neighbour or friend. If there appears to be any conflict of interest, the architect should immediately consult a lawyer or his professional association for guidance.

III. Conditions

Architects should ensure that their normal business activities are not put at risk because of unexpected or unreasonable time demands, or inadequate notices of appearances. Architects should also ensure that informal or personal short-term commitments will not lock them into unwanted longer term involvement. Finally, architects should ensure that clients understand the possibility that some situations may demand particular skill or knowledge beyond that which they possess and that clients ought to retain specialist services they judge to be necessary.

IV. Restrictions

A client may impose restrictions relating to monetary matters, to confidentiality, to access to essential information and to certain directions which an investigation might take. The investigation may suggest that the architect's testimony may take a direction not in keeping with the wishes of the client. In such circumstances, the architect has an immediate obligation to advise the client and counsel of the situation. In rare cases, a client or his counsel may seek to impose restrictions on access to information which makes a fair and dispassionate opinion impossible. In these cases it is incumbent upon the architect to either obtain relief from the restrictions, or decline the retainer. Impressions formed about your credibility and capacity as an expert witness in one case can have lasting consequences. Risking your credibility for the future by taking on a retainer with which you are uncomfortable is a bad gamble.

V. Confidentiality

In day-to-day practice, the architect has an ethical and often contractual obligation to keep secret and confidential any conclusions reached during any investigation undertaken on behalf of a client. However, the court has the authority to overrule or alter the original obligation. There is a rule of evidence termed "privilege", which permits a witness to refuse to answer a particular question, or to produce a particular document. Relationships between architects and their clients do not qualify for such "privilege". As a result, the architect who is asked to keep the source or the nature of secret information or trade secrets fully confidential and protected, cannot extend such assurances in most court cases. It will be up to the court or tribunal involved to decide whether architects should be forced to violate a promise of confidentiality. Always label reports as "privileged for the advice of counsel". This assumes of course that the reports have been requested by client's counsel. Also be sure to include a clause that specifies that the report was produced for that particular litigation.

VI. Agreement and Fees

To protect yourself and your client, a written contract setting out the nature of your services should be prepared. The contract may take the form of a detailed letter outlining the architect's understanding of the commission.

Any agreement should make it clear to the client that the architect must remain impartial and is to be reimbursed for professional services, no matter what the outcome. Architects should adequately address issues relating to fees and disbursements. The agreement should set out the services to be provided, the rates of payment applicable, the times and terms of payment, and the desired guarantee of fees. Progress payments and escalation provisions should be included for extended periods of investigation or activity. Changes and additions to the original terms of the contract may be initiated by the client, legal counsel, or by the architect. It is important that careful documentation and accounting be made for all "extras".

Conducting Investigations and Field Work

Before architects can give any evidence at all, they must have made an investigation which involves an examination of the matter in dispute in the field and any analysis that might be required in order to reach their conclusions.

I. Degree of Thoroughness

The architect must be fully aware of the client's needs, address only these in the report and avoid unnecessary investigation. A personal inspection of the site where the incident occurred is considered to be essential. Professional quality photographs, preferably in colour, will assist with later descriptions of the site or of site materials and should be accompanied by documentation and witnessing to make sure they are admissible in court. The architect should review and become familiar with all pertinent documentation, manuals, standards, specifications, contracts, hardware or other materials and design drawings. A search of available technical literature, and identification of related commentary, can be useful.

II. Documentation

It is important that all pertinent information, especially information that may be unavailable at a later time, be properly identified and recorded. The architect should record where; when and from whom information was obtained; what the information is; where it came from and when; names and descriptions of things; and time, place, and location of site investigation(s).

Defining the Problem

Clients may ask for something without knowing precisely what they want, or the implications of the request. The architect must know what the client's strategy is, and what the course of action is expected to be in order to judge the usefulness of the request. Architects must restrict both interest and activity to architecture. They should avoid attempting to solve the case by departing from their field of expertise, keeping their opinion to architectural matters and avoiding speculation, or subjective opinion.

Analysis

It is important that the architect acting as expert witness did the work him or herself, in order that he or she be able to answer questions that will arise from consideration of the analysis.

Often, the underlying workup report will have been prepared or performed by an associate or partner working with the expert who is testifying. The involvement of a colleague should be disclosed in the report. It is important not to mislead anyone as to the precise nature of the retainer and background involvement.

Formulating Conclusions

The architect must assess the information gathered during investigations to determine if it is sufficient to form a conclusion. If it is, the conclusion may be written; it should be carefully worded, so that it may be read in a positive sense. The use of disclaimers can dilute, if not negate the effect of the report, but the wording should accurately reflect the degree of certainty of the architect's opinion.

The architect should not hesitate to express an opinion in the conclusion, but it is very important to show how the opinion was formed from the data presented.

If it is not possible to state an opinion (for instance, in the event of insufficient information), the architect should clearly state that no final opinion was reached and the reasons why.

Preservation of Evidence

It is important that data and material which may become official evidence in a hearing or court procedure be held safely under the architect's control until required to be produced. Evidence should be identified by marking and/or tagging it with information about where, when and under which circumstances it was taken. It should be retained until appropriate clearance or permission for destruction is given.

Calculations not in the report, test results and file data should be kept confidential, but in such a "presentable" form that they can be used at an appropriate time and on the understanding that they may become a part of court documentation.

Reports

Architects tend to use drawings as their principal means of communication; however, in work done for legal purposes, it is customary to use a written report as the primary means of conveying the sense of the work. The language and writing style should be simple and direct, and the use of abbreviations and technical terms should be avoided where possible.

I. The Preliminary Report

The preliminary report serves only one purpose: it is a means of apprising the client about the progress of the investigation. Conclusions of any kind should be avoided.

II. The Final Report

Before preparing the final report, it will be desirable to discuss the findings and conclusions with the client and his or her counsel to obtain guidance about the precise issues the client wishes to have included. Nevertheless, the architect must accept final responsibility for the report and must not permit the client to exert influence on its final form or substance.

The final report must deal with the agreed-upon terms of reference, i.e., the client's needs. The introduction should explain who hired the architect, what the terms of reference were, and what was done to fulfill the commission. It should be complete and impartial. Observation about possible weaknesses in the client's position should be communicated to the client and his or her counsel separately, as this increases the likelihood that neither the client nor his or her counsel are misled by an overly favourable report, or by failure to give proper emphasis to adverse considerations.

While the body of the report must be simple and couched in non-technical language, appendices are permissible and may cover specialty subjects intended to be read by knowledgeable individuals.

The Giving of Evidence

Architect witnesses bring "expert" knowledge to proceedings primarily involving people who do not share that knowledge. **Architects are strongly advised to consult with counsel before engaging in such proceedings and to receive advice and instruction about all of their actions.**

I. Preparation for the Appearance

Professional witnesses should know their subject thoroughly. They should review all file documents to the point where they are fully familiar with the contents and believe they can answer questions relating to them. Architects should be aware that opposing counsel will attempt to confuse witnesses by asking questions sufficiently different from those anticipated. This can be counteracted through conducting the preparation with assistance from legal counsel.

When appearing on behalf of a client who is represented by a lawyer, it is essential that the architect request a preliminary meeting with the lawyer. This allows the architect to review the evidence that will be presented and ensure that counsel for the client understands what will be said on the stand and what that evidence means.

In less formal proceedings, architects should remember to confine their answers to those matters with which they are thoroughly familiar and avoid non-architecture related opinions.

Architect witnesses have an obligation to choose their words carefully so that those at the hearing understand the technical information being conveyed. It may be useful to rehearse the presentation. It is important that architect witnesses remember that the testimony being given is not directed to the examiner, cross-examiner, or client, but to the "court" with the objective of enabling the court to make the best judgment possible. The witness should not speak as an advocate, or as a debater, but should present facts, expert observations and conclusions.

II. What to Expect in the Courtroom

When waiting to be called as a witness, it is important to be careful in conversations with strangers or those whose particular interests in the proceedings are unknown. While politeness is expected, and safe topics may be treated in a light vein, discussion of evidence must be avoided.

III. Procedures and Rules

Witnesses are usually called in a previously agreed upon order. They will be subject to direct examination, cross-examination, re-direct examination and, very occasionally, re-cross-examination, in that order.

Witnesses should take instructions from the officials of the court, such as the judge and the lawyers involved; they should follow their lead, and observe with care the customary courtesies. It is not desirable to be moving about when not actively involved. A discreet silence should be maintained. Notes may be taken during the proceedings.

Once called and sworn, witnesses under examination are not customarily allowed to discuss the case with anyone, until asked to stand down. However, on occasion, they may properly discuss with their counsel matters which have not been covered in the examination up to that time, but it is inadvisable for witnesses to initiate such discussions. Between completion of examinations-in-chief, commencement of cross-examination, and commencement of re-examination, no discussions relative to any aspect of the proceedings are permitted.

Witnesses before tribunals will usually find that many of the usual courtroom procedures will apply. However the conduct of the hearing will follow the rules laid down by the chair; these must be observed without question

Qualification as an Expert by the Court

In giving oral evidence as to qualifications, the witness should concentrate on only those qualifications which relate to the case at hand. Prepared listings of qualifications or curricula vitae are almost always useful and may, with the agreement of counsel, be introduced into the proceedings as an exhibit. If such documents are used, they should be concise and should be shown to counsel well in advance of the hearing.

Conduct Under Examination

I. Examination-in-Chief

The witness will be first examined by the client's lawyer who will ask a series of questions similar to those discussed in private. It is important that the answers given are consistent with previous replies and limited only to exactly what was asked. Witnesses must be careful to avoid being "set-up" for trouble during cross-examination by saying things that may be inconsistent with their general testimony.

If a witness recalls additional relevant information after they have answered, witnesses can retrace previously covered steps, provided the lawyer and court agrees. After providing an initial answer, a witness may request the opportunity to offer the further explanation. The lawyer and the court will direct the witness on how to proceed.

While on the stand, the use of notes should occur only if such a procedure has been agreed to beforehand by the parties involved, including legal counsel, since there is the possibility that the notes could be forced into evidence as exhibits. When testifying as "experts", it is essential that witnesses give only their own opinions; reliance on other experts or text books is self-defeating.

II. Cross-Examination

This stage will be conducted by lawyers representing other parties. Their objective may be to discredit witnesses by questioning their competence, or by trying to find inconsistencies in their testimony in order to cast doubt on the whole testimony. It is most important to preserve credibility. This may be accomplished by maintaining a consistency in answers, by reasonable and logical explanations where possible, by asking for clarification when necessary, and by acknowledging that one does not know, if that is the case.

Lawyers use many techniques to put witnesses off guard. They may suggest variations of what was originally said by witnesses, and ask them to agree to increasingly narrow generalizations, until witnesses are unable to prevent themselves from being shown to be inconsistent.

Architect witnesses should listen closely to the exact question put by the cross-examiner and, unless fully satisfied that the proposition correctly expresses their views, use their own language instead. If asked why they are reluctant to agree to the cross-examiner's proposition, witnesses can reply that they can never quite be sure what the cross-examiner means, but can at least be sure of what they themselves have in mind when using their own words to express opinions.

Witnesses should be careful attempting to justify their testimony. If the cross-examiner attacks in an accusatory fashion, implying that something is wrong, the witness should listen carefully to the questions, and answer as directly as possible, consistent with previous testimony. If the cross-examiner demands a "yes or no" answer, the witness should assess whether the question cannot be answered in that way without misleading the court. If it is not possible, simply advise the court.

Architect witnesses should scrupulously maintain an attitude of professionalism, accompanied with sincerity and honesty. It is important that witnesses avoid losing their temper, or displaying any rudeness toward cross-examining counsel, otherwise they may appear to be less sympathetic and less credible.

III. Re-Direct Examination

Re-direct examination may follow cross-examination. Counsel for the witness' client may ask additional questions on points not previously raised by the witness, and on which clarification is needed. The additional questioning may also be necessary to correct impressions the client's lawyer suspects may have been made during cross-examination. While under re-direct examination, follow the usual guidelines and testimony as outlined above.

Conclusion

The preceding guideline has been prepared to provide architects who become involved in court proceedings or tribunals with suggestions on how to proceed as a witness. It is hoped that these suggestions will lead to making the architect's performance as a witness more effective. In any case, it should also serve as a caution to architects who are considering becoming witnesses or who are already involved in proceedings of the pitfalls and concerns which may arise:

In conclusion, the following basic guidelines are worthy of review:

- 1. When called upon to act as a witness in respect of a project on which you have previously provided architectural services, always contact your professional errors and omissions insurer for advice.
- 2. If you are called upon to act as an independent expert, be sure that you have adequate expertise and experience with respect to the issues on which you are being asked to testify.
- 3. Always remember that whether you are an independent expert, or are testifying on behalf of an existing client, you are a witness, and not an advocate. Leave the advocacy to others. Concentrate on giving accurate and complete evidence.
- 4. In all situations where you will be testifying in court, prepare thoroughly, familiarize yourself comprehensively with the information base on which you may be questioned, and in circumstances where you are an independent expert, request an opportunity to review your evidence with counsel in advance.
- 5. During testimony, avoid arguments and personalities. Maintain your composure. Answer the questions which you are asked directly and do not attempt to anticipate the next question.
- 6. Whether you are retained as an independent expert, or in your capacity as the current or past architect for an existing client, satisfy yourself with respect to the contractual arrangement in place with respect to your testimony. Litigation proceedings are notoriously lengthy and your involvement may take much longer and be at a greater personal cost in terms of time and other resources than you have anticipated.

Definitions

***Admissible*:** Relevant evidence not otherwise excluded.

Arbitration: A hearing to determine an interest dispute, heard by an arbitrator.

***Board*:** A body of persons to which certain powers are delegated or assigned or who are elected for certain purposes.

***By-law*:** A law binding on all persons to whom it applies.

***Commission*:** The name of a body which has the authority to administer a program or statute, manage a fund or a public utility, investigate a matter or perform some other public function.

***Conflict of Interest*:** Interests that conflict, and that might influence or interfere with the ability to perform his or her function or exercise of duty. This can occur when the person is in a position of trust which requires him or her to exercise judgment on behalf of others (people, institutions, etc.) and also has interests or obligations of the sort that might interfere with the exercise of his or her judgment, and which the person is morally required to either avoid or openly acknowledge.

***Counsel*:** A barrister or solicitor, in respect of the matters or things that barristers and solicitors respectively, are authorized by the law of a province to do or perform in relation to legal proceedings.

***Discovery*:** Disclosure by the parties before trial of information and documents.

***Escalation Clause*:** Clause in agreement providing for increases in rent, wages, or other form of payment, based on some factor such as tax increases.

***Evidence*:** The oral and written statements and information and any actual things produced in a proceeding, anything which may be used to prove a fact or support an assertion.

***Examination*:** The questioning of a person under oath.

***Exhibit*:** A document or object admitted as evidence in court.

***Expert Witness*:** A witness whose competency to form an opinion on some subject before the court was acquired by a special course of study or experience.

***Hearing*:** Generic label to describe trials, appeals, and interlocutory proceedings (proceedings which are provisional, temporary or determined by the court prior to final judgement).

***Inquest*:** An inquisitorial investigation, where no parties' rights are directly affected.

***Inquiry*:** An investigation, a hearing.

***Litigation*:** A law suit and all the related proceedings; the term may refer to any proceeding before a court of tribunal.

***Notice of Appearance*:** A party's written notice filed with the court or oral announcement on the record informing the court and the other parties that the party wants to participate in the case.

***Objection*:** A formal statement opposing something that has occurred, or is about to occur, in court and seeking the judge's immediate ruling on the point.

***Privilege*:** Acts as an exception to the truth finding process of trials. All relevant evidence is presumed admissible but some probative and trustworthy evidence is excluded in order to serve overriding social interests. Similarly, some communications arising out of defined relationships are exempt from disclosure in judicial proceedings.

***Proceeding*:** The regular and orderly progression of a lawsuit, including all acts and events between the time of commencement and the entry of judgement.

***Provincial Court*:** Court constituted under s. 92(14) of the *Constitution Act* and constituted, maintained and organized by the provincial legislature to administer justice in the province.

***Remuneration*:** Payment for services provided.

***Retainer*:** A preliminary fee given to secure services and induce them to act for the client.

***Small Claims Court*:** An inferior court with a limited jurisdiction over civil matters limited as to monetary jurisdiction and as to subject matter.

***Solicitor*:** Refers to one who does not appear in court regularly but does any of the other work of being a lawyer.

***Statute*:** A law or act which expresses the will of a legislature or Parliament.

***Subpoena*:** Document issued by a third party compelling a person to attend proceedings as a witness in order to give testimony, given under the threat of penalty.

***Summons*:** A document issued by a court, an agency, board or commission, or another person authorized to issue summonses, requiring a person to attend as a witness at a trial, hearing or examination, to produce documents or other things or to testify before the issuing body or person.

***Testify*:** Giving evidence by means of oral communication in a proceeding.

***Testimony*:** The evidence which a witness gives in a court or tribunal.

***Tribunal*:** A body or person which exercises a judicial or quasi-judicial function outside of the regular court system.

***Witness*:** A person who gives evidence orally under oath or by affidavit in a judicial proceeding.

All definitions are taken from, or based on, The Dictionary of Canadian Law, 3rd ed. (Toronto: Thomson-Carswell, 2004) and Black's Law Dictionary, 8th ed.

References

Canadian Sources

Marie Corbett, "The Ontario Municipal Board: Planning and Zoning Cases" (1976) 14 Osgoode Hall L. J., No. 1.

Lawrence E. Glazer, "Architects Can Provide Expert Advice in Construction Cases" (1998) 18 Lawyers Weekly, No. 11, 9(2).

Andrew J. Roman, Guidebook on How to Prepare Cases for Administrative Tribunals, 1st ed. (Ottawa: Consumers' Association of Canada, 1997).

S.S. Aidlin, *The Expert Witness Prepares for Court*.

International Sources

"Architect and Engineer Liability" (1995) 35 Washburn L.J. 32.

"Authorizing the Expert Witness to Assassinate Character for Profit: A Re-examination of the Testimonial Immunity of the Expert Witness" (1997) 28 U. Mem. L. Rev. 239.

John A. Bickley, "The Engineer and Litigation" (1991) 8 Int'l Constr. L. Rev. 398.

John P. Black & Richard A. Long, "The Engineer as an Expert Witness: Perspective and Performance" 11 Envtl. Claims J. 83.

"Daubert v. Merrell Dow Pharmaceuticals, Inc: 'Gatekeeping' or Industry 'SafeKeeping'?" (1998) 43 S.D. L. Rev. 566.

"Eight Gates for Expert Witnesses" (1999) 36 Hous. L. Rev. 743.

"Expert Information and Expert Evidence: A Preliminary Taxonomy" at the Expert Admissibility Symposium: What is the Question? What is the Answer? How Should the Court Frame a Question to Which Standards of Reliability Are to be Applied? (2003) 34 Seton Hall L. Rev. 141.

"Fragmenting Knowledge, Misconstruing Rule 702: How Lower Courts Have Resolved the Problem of Technical and Other Specialized Knowledge in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*" (1999) 1 J. Intell. Prop. 1.

John K. Gisleson, "Testimony of Engineers and Other Non-Scientific Experts – Evidentiary Reliability Consideration" 70 Pa. B.A.Q. 74.

Paul Hyett, "Architect as Expert" (1994) 138 Solicitors Journal No. 48, s. 30(1).

Tomas Kennedy-Grant, "Expert Evidence in Construction and Engineering Cases" (2003) 20 pt. 3 Int'l Constr. L. Rev. 401.

Paul G. Kerr, "The Costs of Consulting Engineers in Civil Litigation: The Basis of Charge" (1991) 41 N. Ir. Legal Q. 123.

Wayne C. Lusvardi, "The Real World of Forensic Engineering" (2001) 13 Envtl. Claims J. 103.

Thomas Lyons, Esq., "Frye, Daubert and Where Do We Go From Here?" (1997) 45 RI Bar Jnl. 5.

Richard R. Macguire, "Experts in Low Speed Impact Litigation" (2005) 77 NY state Bar Assn 43.

"Marnette v. Morgan: When Other Evidence Contradicts the Expert Testimony – Admissibility or Credibility?" (1993) 38 S.D.L. Rev. 763.

Phillip H. Miller, "Cross-examining a Biomechanical Engineer" (2001) 37 Trial 38.

"Much Ado About Nothing – The Supreme Court Still Fails to Solve the General Acceptance Problem Regarding Expert Testimony and Scientific Evidence" (1993) 8 J.L. & Health 245.

David Nolte, "Semi-annual Guide to Expert Witnesses: Improving Cross-Examination of Expert Witnesses" (2005) 28 Los. Angeles Lawyer 41.

David Nolte, "Semi-annual Guide to Expert Witnesses: Ten Rules" (2004) 27 Los Angeles Lawyer 50.

"Novel Expert Evidence in Federal Civil Rights Litigation" (1995) 45 Am. U.L. Rev. 2.

"Protecting Juries From Themselves: Restricting the Admission of Expert Testimony in Toxic Tort Cases" (1994) 48 SMU L. Rev. 103.

"Quantifying Liability Under the Architect's Standard of Care" (1995) 29 U. Rich. L. Rev. 1471.

Barry A. Ross, "Eminent Domain and the Community Association" (2003) 45 Orange County Lawyer 28.

L.D. Ryan, "The Fiction of Technical Peer Review" (2003) 39 Trial 68.

"Scientific Evidence in the Age of Daubert: A Proposal For a Dual Standard of Admissibility in Civil and Criminal Cases" (1994) 21 Pepp. L. Rev. 1391.

"Screening Expert Testimony After Kumho Tire Co. v. Carmichael" (2000) 8 J.L. & Pol'y 543.

"Sharpening the Focus on Daubert's Distinction Between Scientific and Non-scientific Expert Testimony" (1997) 34 San Diego L. R. 1719.

"The Admissibility of Lay and Expert Opinions" (1989) 57 Tenn L. Rev. 103.

"The Crumbling Tower of Architectural Immunity: Evolution and Expansion of the Liability to Third Parties" (1984) 45 Ohio St. L.J. 217.

"The Effects of Daubert on the Admissibility of Expert Testimony in State and Federal Criminal Cases" (2002) 8 Psych. Pub. Pol. and L. 339.

"The Same Mold Story?: What Toxic Mold Is Teaching Us About Causation in Toxic Tort Litigation" (2005) 83 N.C.L. Rev. 518.

"Tort Law – Municipal Building Inspector's Actions Fall Within Special Duty Exception to the Public Duty Doctrine – Quality Court Condominium Ass'n v. Quality Hill Development Corp., 641 A. 2d. 746 (R.I. 1994)" (1995) 29 Suffolk U. L. Rev. 655.

"What Is an Environmental Expert? The Impact of Daubert, Joiner and Kumho Tire on the Admissibility of Scientific Expert Evidence" (2001) 19 UCLA J. Envtl. L & Pol'y 401.

"Witness Immunity or Malpractice Liability for Professionals Hired as Experts?" (1998) 17 Rev. Litig. 393.

Checklist: Scope of Services

This chart is a typical checklist of services offered by the architect and his or her sub-consultants. The nature of the individual project and the services customized to the client's needs will determine the scope of services required.

Project Inception	Project Assessment	Concept Approval	Approvals from Authorities	Awards of Construction Contract	Substantial Performance of Construction/Occupancy Permit

1.0 Pre-design	2.0 Schematic Design	3.0 Design Development	4.0 Construction Documents	5.0 Bidding or Negotiation	6.0 Construction — Contract Administration	7.0 Post-construction
Architect's Services • Facility Programming • Space Relationships/ Flow Diagrams • Project Development Scheduling • Project Budgeting • Life Cycle Cost Studies • Economic Feasibility Studies • Agency Consulting/ Review/Approval • Site Selection/ Analysis Utilization • Environmental Studies • Energy Studies • Existing Facilities Surveys • Client-Supplied Data Coordination • Services Related to Project Management • Presentations • Marketing Studies • Project Financing • Special Studies • Re-Zoning Assistance • Project Promotion **Special Consultants' Services** • Legal Survey • Geotechnical Analysis	**Architect's Services** • Client-supplied Data Coordination • Program and Budget Evaluation • Review of Alternative Design Approaches • Architectural Schematic Design • Schematic Design Drawings and Documents • Statement of Probable Construction Costs • Client Consultation • Interior Design Concepts • Special Studies (Future Facilities, Environmental Impact, etc.) • Special Submissions or Promotional Presentations • Special Models, Perspectives or Computer Presentations • Project Management • Agency Consultation **Consultants' Services** • Structural Design Concepts • Mechanical Design Concepts • Electrical Design Concepts • Statements of Probable Costs **Special Consultants' Services** • Civil Design Concepts • Landscape Concepts • Statements of Probable Costs	**Architect's Services** • Client-supplied Data Coordination • Design Coordination • Architectural Design Development • Design Development Drawings and Documents • Statement of Probable Construction Costs • Client Consultation • Interior Design Development • Special Studies/Reports (Planning Tenant or Rental Spaces, etc.) • Promotional Presentations • Models, Perspectives or Computer Presentations • Project Management • Agency Consultation **Consultants' Services** • Structural Design Development • Mechanical Design Development • Electrical Design Development • Statements of Probable Costs **Special Consultants' Services** • Civil Engineering Design Development • Landscape Development • Detailed Construction Cost Estimates or Quantity Surveys	**Architect's Services** • Client-supplied Data Coordination • Project Coordination • Architectural Construction Documents (Working Drawings, Form of Construction Contract and Specifications) • Document Checking and Coordination • Statement of Probable Construction Costs • Client Consultation • Interior Construction Documents • Alternative Bid Details and Special Bid Documents • Project Management • Agency Consultation **Consultants' Services** • Structural Construction Documents • Mechanical Construction Documents • Electrical Construction Documents • Statements of Probable Costs **Special Consultants' Services** • Civil Engineering Construction Documents • Landscape Documents • Detailed Construction Cost Estimates or Quantity Surveys	**Architect's Services** • Client-supplied Data Coordination • Project Coordination • Issue Bidding Documents • Issue Addenda • Bid Evaluation • Construction Contract • Client Consultation • Separate Bids or Negotiated Bids • Services Related to Bidders' Proposals • Project Management **Consultants' Services** • Issue Bidding Documents • Issue Addenda • Bid Evaluation **Special Consultants' Services** • Issue Bidding Documents • Issue Addenda • Bid Evaluation	**Architect's Services** • Construction Review • Progress Reports/Evaluation • Process Certificates for Payment • Interpretation of Contract Documents • Review of Shop Drawing Product Data/Sample • Change Orders • Substantial Performance Report and Certification • Client Consultation • Interior Construction Inspection • Full-time Project Representation • Administration of Separate Contracts • Project Management • Promotional Material • Record Drawings • Agency Consultation **Consultants' Services** • Structural Inspection/Reports • Mechanical Inspection/ Reports • Electrical Inspection/Reports • Record Drawings • Certification of Progress **Special Consultants' Services** • Civil Construction Inspection • Landscape Inspection • Detailed Cost Accounting	**Architect's Services** • Field Review • Deficiency Assessment • Instructions for Correction of Deficiencies • Review of Warranties • Total Performance Inspection and Certification • Client Consultation • Start-up Assistance • One-year Warranty Inspections **Other Services** • Fine Arts/Crafts/Graphics • Non-building Equipment Selection • Building Analysis and Reports • Services Related to Alterations and Demolition • Life Cycle Cost Monitoring • Environmental Monitoring • One-year Warranty Inspections **Consultants' Services** • Start-up Assistance • Systems Performance Review • Non-building Equipment Selection • Life Cycle Cost Monitoring • Services related to Alterations and Demolition

Checklist: Supplemental Architectural Services

The following is a list of some of the specialized services offered by architectural practices or coordinated with special consultants.

Pre-design Services

- ❑ Facilities Programming
- ❑ Feasibility Studies
- ❑ Existing Site and Facilities Analysis
- ❑ Traffic and Parking Studies
- ❑ Existing Equipment and Furniture Inventories
- ❑ Energy Analysis
- ❑ Master Programming and Planning
- ❑ Environmental Studies
- ❑ Space Schematics/Flow Diagrams
- ❑ Marketing Studies
- ❑ Financial Analysis
- ❑ Project Financing
- ❑ Advisor for Architectural Competitions
- ❑ Preparation of Proposal Call Documents

Post-construction Services

- ❑ Commissioning Services
- ❑ Post-occupancy Studies
- ❑ Maintenance and Operational Programming
- ❑ Building Maintenance Manuals
- ❑ Post-occupancy Evaluation

Site Development Services

- ❑ Site Analysis and Selection
- ❑ Site Development Planning/ Site Plan Agreement
- ❑ Detailed Site Utilization Studies
- ❑ On-site Utility Studies
- ❑ Off-site Utility Studies
- ❑ Environmental Studies and Reports
- ❑ Zoning and Land Use Amendments
- ❑ Geotechnical Engineering
- ❑ Site Surveying
- ❑ Legal Survey
- ❑ Landscape Design

Materials and Systems Testing

- ❑ Procurement of Testing Services
- ❑ Review and Analysis of Testing

Interior Design and Design Services

- ❑ Space Planning
- ❑ Adaption of Mechanical and Electrical Systems and other Systems to Tenant Needs
- ❑ Preparation of Furnishing Requirements
- ❑ Bidding or Purchasing Procedures for Furniture
- ❑ Furniture and Equipment Selection and Layout
- ❑ Special Furnishings Design
- ❑ Tenant-related Services
- ❑ Interior Partition Location
- ❑ Furniture and Finishing Specifications
- ❑ Selection of Interior Materials, Finishes, and Colours
- ❑ Procurement of Furniture
- ❑ Coordination of Installation and Delivery of Furniture
- ❑ Design of Interior and Exterior Signage and Symbols
- ❑ Selection or Acquisition of Fine Arts or Crafts
- ❑ Graphic Design
- ❑ Documentation of Requirements and Procurement of Graphics Work

Project Administration and Construction Management Services

- ❑ Project Administration
- ❑ Disciplines Coordination/Document Checking
- ❑ Consulting with and Review and Approval of Authorities
- ❑ Submittal Services
- ❑ Owner-supplied Data Coordination
- ❑ Schedule Development/Monitoring
- ❑ Testing and Inspection Administration
- ❑ Project Representation
- ❑ Supplemental Documentation
- ❑ Administration of Multiple Contracts
- ❑ Detailed Cost Estimates and Quantity Surveys
- ❑ Value Analysis or Value Engineering
- ❑ Life Cycle Cost Analysis
- ❑ Coordination of Mock-ups
- ❑ Facility Management
- ❑

Promotion and Public Relations

- ❑ Preparation of Press Releases
- ❑ Preparation of Promotional Brochures
- ❑ Presentations at Public Meetings
- ❑ Preparation of Leasing Material
- ❑ Preparation of Models
- ❑ Preparation of Renderings
- ❑ Condominium Documentation
- ❑ Computer Presentations

Documentation Services

- ❑ Preparation of Special Certificates and Letters of Assurance
- ❑ Certified Area Calculations
- ❑ As-Built Drawings and Computer Files
- ❑ Preparation of Measured Drawings
- ❑ Building Inspection and Reporting
- ❑ Aerial Site Photography
- ❑ Still Photography of Existing Conditions
- ❑ Periscope Photography of Models
- ❑ Presentation Photography of Renderings or Models
- ❑ Construction Progress Photographs
- ❑ Architectural Photography of Completed Building or Site
- ❑ Videotaping
- ❑ Computer Database
- ❑ Inventories of Materials, Equipment or Furnishings

Architectural Conservation

- ❑ Historic Building Documentation
- ❑ Heritage Conservation District Studies
- ❑ Conservation Reports

Expert Witness

- ❑ Testimony at Court or Hearing
- ❑ Opinion on Codes or Regulations

Computer Applications

- ❑ Computer Renderings
- ❑ 3-D Computer Presentations and Walk-throughs
- ❑ Electronic Communication and Distribution
- ❑ Computer Analysis and Mock-ups
- ❑ Project Scheduling
- ❑ Project Accounting

Urban Design

- ❑ Streetscape Design
- ❑ Drafting of Zoning Bylaws and Regulations
- ❑ Shadow Studies
- ❑ Urban Design Studies
- ❑ Wind Studies
- ❑ Land Use Studies
- ❑ Transportation Studies

Research

- ❑ Research in Construction Materials and Methods
- ❑ Building Envelope Investigation

2.2 Standard Forms for the Management of the Practice

Guide to the Use of the Forms
- Purpose of the Forms
- Office Manual
- Other Forms

1. Forms for Human Resources Management
- 1.1 Typical Job Description
- 1.2 Application For Employment
- 1.3 Interview Evaluation Form
- 1.4 Employment Agreement
- 1.5 Performance Evaluation Form

2. Forms for Financial Management
- 2.1 Invoice
- 2.2 Fee Calculation Sheet
- 2.3 Project Cost Control Chart
- 2.4 Time Report
- 2.5 Expense Claim Form
- 2.6 Purchase Order

3. Forms and Stamps for the Management of the Practice
- 3.1 Project Directory
- 3.2 Office Stamps

Sample Forms for the Management of the Practice

Guide to the Use of the Forms

Purpose of the Forms

The forms in this section of the Handbook are provided to assist the architect in the overall business administration or management of the practice. Standardized forms within an architectural practice are an essential management tool. Most architects customize forms for their own operations. Forms provided at the end of this chapter are examples of actual or suggested forms used by architectural practices in Canada for reference.

Office Manual

All employees should be familiar with the forms adopted by the practice and the architect should include the forms in an Office Manual (refer also to Chapter 2.1.5, *Office Administration*). Directions for the use of the forms, particularly for Time Reports and Expense Claim forms, should be included in the Office Manual.

Other Forms

This section provides samples of some of the basic forms used by most architectural practices. Certain practices may require other forms, including:

Other Forms for Human Resources Management

- **Job Description**
- **Application for Employment**
- **Interview Evaluation Form**
- **Letter of Acknowledgement** (for job application)
- **Letter of Regret** (for unsuccessful job applicants)

Other Forms for Financial Management

- **Statement of Account** (outstanding invoices less payments)
- **Record of Drawing Reproductions**
- **Record of Telephone Calls** (long distance and fax charges)
- **Purchase Order**

Other Forms for Marketing

- **Letter of Introduction** (to prospective clients)
- **Typical Résumé** (for proposals)
- **Project Data Sheet** (for proposals)
- **Client Contact Data Sheet** (for marketing)

Refer to Chapter 2.4, *Sample Forms for the Management of the Project*, for Forms for General Communications, such as a Memorandum, Transmittal.

1. Forms for Human Resources Management

1.1 Typical Job Description

Purpose
Job descriptions:

- assist in recruiting staff and preparing advertisements;
- assist staff in understanding their responsibilities;
- clarify the organization of the practice and lines of reporting;
- assist in performance evaluation of staff;
- assist in identifying human resource overlaps or deficiencies within the practice.

Content
Job descriptions should contain the following basic information:

- job title or name of position;
- employment status (i.e., permanent, temporary, part-time, independent contractor, etc.);
- reporting and relationship within the architectural practice;
- description of duties and responsibilities;
- educational requirements;
- experience requirements;
- requirements for membership in professional or technical associations;

- special conditions of employment related to the position (special skills, travel requirements, languages, etc.).

1.2 Application For Employment

Note: Architects and others in the design and construction sector usually provide personal résumés or curricula vitae and an Application for Employment is not a common form used by architectural practices.

Purpose
An application form, which assists in recruiting new staff, also:

- helps analyze potential employees;
- provides a sample of the applicants' skills (e. g., presentation, use of language, organization);
- provides a database for office use.

Content
The Application Form should request the following information:

- name of position applied for;
- name and contact information (address, telephone and fax number, E-mail address);
- date;
- education;
- work experience;
- professional licence/registration and affiliations;
- references.

The Application Form may also request the following information:

- volunteer and community work experience;
- personal interests and hobbies;
- career goals;
- most current salary;
- fluency in languages.

In addition, the form may provide space for the interviewer's comments about the applicant.

Because human rights codes and employment standards acts are in effect in most provinces, Application Forms may NOT request the following information:

- age;
- marital status;
- family status (e.g., single parent);
- disabilities;
- record of offences;
- citizenship, race, ancestry, place of origin, colour, ethnic origin, or creed;
- sex or sexual orientation;
- record of offences.

Ensure that the application form complies with the requirements of the applicable province.

1.3 Interview Evaluation Form

This form can be appended to the Application Form; however, it may be preferable to separate the two forms for purposes of confidentiality.

Purpose
This form is used to make:

- a record of the interview;
- a record of the interviewer's personal notes and observations;
- an appraisal of the applicant.

Content
The Interview Evaluation Form should contain the following information:

- date of interview;
- name of applicant;
- name of interviewer;
- personal notes and observations;
- salary expectations;
- verification of references.

1.4 Employment Agreement

An employment agreement is also discussed in Chapter 2.1.7, *Human Resources*.

Purpose
The agreement:

- creates a contract;
- outlines terms and conditions of employment;
- identifies probationary periods, if any;
- prevents misunderstandings.

Content
A sample Employment Agreement is provided as a template.

Guide for the use of Form 1.4, Employment Agreement

1.4.1. *Names:* Identify the legal names of the employer and the employee at outset of the agreement.

1.4.2. *Probation:* Care should be taken in establishing the length of the probationary period. A three- to six-month period is typical.

1.4.3. *Termination:* The period of notice to be given by the employer to the employee must be carefully established. Verify what length of notice period is required in provincial legislation. For consistency, a common notice period should be established for all employees. A longer notice period for a senior employee, owing to contribution to the practice, might be considered.

This period of notice given by the employee to the employer must also be carefully established. However, consideration should be given to agreeing to a notice period the same as that from employer to employee. A longer notice period for a senior employee, owing to contribution to the practice, should be considered.

1.4.4. *Restrictive Covenant:* The employee should carefully consider this section. In a small or remote location, this clause (if the time period is too lengthy) may effectively prevent an employee from quitting and establishing his or her own architectural practice.

1.4.5. *Notice:* State the address for which official notice is to be sent for employer and employee.

1.4.6. *Date:* The Agreement is effective as of the commencement of employment. This date is identified above the witnessed signature of the employee and of the person with the authority to bind the employer. If the commencement of the term of employment differs from the term of the agreement, adjust article 1 "Term of Employment" accordingly.

Schedule A

1.4.7. *Position:* The employment position (i.e., job title or job description) should be indicated or described. Refer to 1.1, "Typical Job Description," above. Despite the use of a specific job title, it should be recognized that employees in many architectural practices may be called upon to undertake a wide range of tasks. If a job description is preferable to a title, a Schedule "B" could be created to describe the job requirements and then appended to the agreement. If this approach is used, cross-reference the Schedule at article A.1.

1.4.8. *Hours of Work:* Insert the hours of the length of the work day, start and end time, and duration of the lunch period and coffee breaks.

Suggested text: "A normal work day is _ _____ hours, beginning at _____ and ending at _____ , and includes a lunch period of _____ hour(s). A normal work week, excluding holidays and vacations, is five days, Monday to Friday inclusive. A normal work year is 52 weeks, including holidays and vacations."

1.4.9. *Vacation:* Insert the terms and duration of vacation. Verify provincial requirements for vacation periods. Normally, all other staff, other than architects or students of architecture, must receive at least two weeks vacation each year. For consistency between employees, a minimum two-week vacation should be given to all employees. Consideration of a longer vacation period for a senior employee is usual.

Suggested text: "A vacation with pay of _____ week(s) duration shall be provided each year. The employee shall obtain at least _____ week(s) advance approval from the employer of the dates of the vacation. Such approval shall not be unreasonably withheld."

An established formula for increasing the vacation period is recommended. Consistency between employees should be established. Additional vacation of one or two days per full year of employment — following an initial period of employment, with a limit to the maximum length of vacation time — might be considered.

Suggested text: "Additional vacation with pay shall be earned at the rate of _____ additional day(s) per _____ full year of employment following an initial period of _____ years, to a maximum of _____ days."

1.4.10. *Personal Leave:* Verify if your province has a legislated requirement for personal leave. One day of paid personal leave per month of employment to a maximum of twelve days is recommended.

Suggested text: "Personal Leave is provided for illness of the employee or dependant, emergency child care, religious observances or for other needs of a personal nature. Personal Leave is not to be used as vacation time. The employee shall accumulate days for personal leave at the rate of _____ day(s) per full month of employment to a maximum of _____ day(s). The employer shall/shall not compensate the employee for unused days of personal leave at the termination of the employee's employment."

(Strike out "shall" or "shall not" to reflect the practice's policy.)

1.4.11. *Bereavement Leave:* An office policy of leave of absence for an employee's bereavement due to a death in the family should be set out to avoid awkwardness of administration at a difficult time.

1.4.12. *Benefit Plan/Profit-sharing Plan:* Check appropriate box and add Schedule "C" if applicable.

1.4.13. *Professional Fees:* List groups, such as the provincial or territorial association of architects or the Royal Architectural Institute of Canada, in which the employee is expected to maintain membership.

(Strike out "shall" or "shall not" to reflect compensation policy.) If membership in a professional association is a condition of employment, the employee should be compensated by the employer for the fees and dues.

1.4.14. *Performance Evaluation:* Fill in the month. A yearly performance evaluation is recommended. It may coincide with the month of start of employment, the year-end of the business or other convenient time. (Refer also to 1.5, "Performance Evaluation Form.")

1.4.15. *Career Development:* Identify the terms of career development. This section may also be used to address the needs of intern architects to gain specific experience in order to complete the Canadian Experience Record Book.

Suggested texts: "The employer will/will not compensate the employee for the cost of employer-approved career development courses."

(Strike out "will" or "will not" to reflect the practice's policy.) "The Employer may compensate salary, tuition, travel, accommodation, and other related expenses of professional development courses provided advance approval of the employer is granted."

"The employer recognizes that the employee is an intern architect seeking the work experience necessary to obtain licensure. The employee shall provide the employer with an Education Plan which identifies areas of needed work experience and a method of obtaining that experience. The Education Plan shall be reviewed and updated quarterly. The employer will assist the employee, as much as reasonably possible within the workload and nature of the practice,

to gain the required experience. The employee acknowledges that the workload and nature of the practice may not be able to accommodate all required experience."

1.4.16. *Compensation:* Identify the monetary compensation, hourly rate or yearly salary as applicable, deductions, and pay period.

Suggested texts: "The employer shall compensate the employee on the basis of an hourly rate of $_____ /hour of work."

"The employer shall compensate the employee on the basis of a yearly salary of $_____ ."

"The employer shall make all necessary statutory deductions and provide the employee with a statement of pay and deductions at each pay period."

"The employer shall pay the employee on a weekly/bi-weekly/twice monthly/ monthly basis, commencing on _____ ."

1.4.17. *Overtime:* Identify extent of overtime that may be required as a condition of employment. Identify the compensation for overtime work.

Overtime work at one and one-half times the regular rate, for work in excess of 44 hours per week, is the typical requirement. **This should be verified with provincial legislation and regulations.**

Suggested alternative texts:
"The employee shall be paid for each hour worked in excess of _____ hours in any standard week, at an hourly rate of $_____ /hour."

"The employer shall compensate the employee for unpaid overtime work by granting one hour paid leave for each hour of overtime work."

"The employee shall be paid for each hour in excess of _____ hours in any standard week at a rate of _____% of the standard hourly rate."

"The employer will not compensate the employee for overtime work. The employee at his or her own discretion shall provide unpaid overtime work from time to time when essential to provide a professional level of service to the employer's client. Notwithstanding, unpaid overtime work shall not exceed _ _____ hours per standard work week or _____ hours per year."

1.4.18. *Expenses:* Identify out-of-pocket expenses for which the employee will be compensated, and reimbursement procedure (e.g., travel, mileage at _____ /km, long distance charges, etc.).

1.4.19. *Equipment:* Identify the equipment and supplies to be provided by the employer and the employee, respectively (e.g., computers, cellphones or PDAs, safety boots, construction helmet, cameras).

1.4.20. *Other Conditions:* Identify other relevant conditions of employment such as religious holidays not covered by the usual statutory holidays, use of the employee's vehicle, computer use, variation in hours of work (e.g., flex-time, different office hours in summer).

1.4.21. *Amendments:* Use amendments to change the agreement at a future date whenever terms or conditions change. Both parties must sign to acknowledge the change.

Review the agreement at least yearly concurrent with the Performance Evaluation.

1.5 Performance Evaluation Form

Refer also to Chapter 2.1.7, *Human Resources,* for information on Performance Reviews and Evaluation.

Purpose
This form:

- describes an employee's attributes;
- identifies career and professional goals;
- measures productivity;
- adjusts salary or pay scales;
- assists as a tool to improve performance.

Content
The content of this form varies, based on the approach of the architectural practice to employee performance evaluation. Some possible information includes:

- name of employee;
- existing job description;
- review of current workload;
- assessment of competency — the fulfilment of duties and responsibilities;
- communications and interpersonal relations;
- professional development or training;
- objectives:
  - a specific outcome or "deliverable";
  - a method of measurement;
  - a time frame for completion;
- signatures of employee and employer.

2. Forms for Financial Management

2.1 Invoice

The Invoice is the document which lists professional services rendered, together with prices and charges, based on the Client-Architect Agreement. The invoice should indicate the basis for the fee (fixed, percentage of construction cost, per diem, etc.), and provide an orderly calculation of the fees itemizing the services rendered and fees for same. In addition, reimbursable expenses may be included in the Invoice; however, some practices prefer to bill reimbursable expenses separately. Expenses may be supported by receipts or proof of the expense.

Contents
The invoice should contain the following information:

- name of client;
- date;
- project name and number;
- Business Number issued by Canada Revenue Agency (Goods and Services Tax [GST] number or Harmonized Sales Tax [HST] number);
- list of professional services rendered;
- fee earned for services rendered to date;
- list of reimbursable expenses (this may be a separate invoice or appended to the invoice);
- previous payments;
- appropriate taxes (such as GST, HST or TVQ);
- current amount due and payable.

Refer to the sample invoices in this chapter.

One example represents an invoice submitted at 60% of the completion of the construction contract. In the example, the estimated cost of construction at the design stage was $200,000; at the working drawing stage (construction documents phase), the estimate was $220,000. The successful bidder's tender of $218,000 was accepted, and Change Orders during the construction adjusted the contract amount to $226,000.

Additional services, billed hourly for design and documentation involved in the preparation of the Change Orders, are shown on the sample invoice (as per Schedule B, Additional Services, of *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six*). Only the contract administration services for the Change Orders are covered in the percentage fee which is based on the revised contract amount.

The architect's fee is 8%. The fee during the construction administration phase is applied to the current contract amount plus GST or HST (i.e., $226,000 + 5% GST = $241,820).

To facilitate payment, cash flow, and cost control, it is sometimes preferable to issue separate invoices for:

- fees for basic services;
- fees for additional services;
- reimbursable expenses.

Refer also to Chapter 2.1.4, *Financial Management*, and to Chapter 2.1.9, *Risk Management and Professional Liability*.

2.2 Fee Calculation Sheet

The practice must determine the costs of providing the necessary services before submitting a proposal or fee quotation. This form is sometimes called a fee forecast.

Purpose
A fee calculation sheet is necessary to:

- determine the payroll cost and other costs of providing the service;
- identify appropriate personnel and consultants for the service;
- assist in scheduling work within the office;
- assist in fee negotiations with the client.

Content
The sheet should provide the following information:

- project name and number;
- construction value for the project;
- list of professional services required;
- fee forecast:
  - payroll costs;
  - consultants' fees;
  - overhead and profit.

2.3 Project Cost Control Chart

This form can serve as a tool for tracking payroll costs related to a specific project.

Purpose
The form can be used as:

- a status report on each project;
- a performance evaluation tool;
- a reference for future fee calculations;
- a warning to indicate when payroll costs have exceeded the budgeted amount;
- a project planning tool.

Content
The form should include the following information:

- project name and number;
- construction value of the project;
- percentage of architectural services completed to date;
- staff involved, including project manager;
- person-hours expended to date;
- budgeted person-hours remaining;
- payroll and other costs to date;
- fee billed to date;
- fee remaining;
- budget comparison (comparison with Fee Calculation Sheet).

2.4 Time Report

Time reports are a very valuable management tool and should be completed on a weekly basis by every partner, shareholder, and employee in the practice as well as by billable independent contractors.

Purpose
Time reports are:

- a basis for remuneration to employees and independent contractors;
- an historical reference for project scheduling and allocation of human resources;
- a record for monitoring payroll costs and scheduling;
- an evaluation tool for employee performance;
- a documented record of services and additional services provided to clients;
- a management tool for analysis of work activities;
- a record to assist in the completion of the *Canadian Experience Record Book* for intern architects.

Content
Every time sheet should include the following information:

- employee name (and number for larger firms);
- time period;
- project name and number;
- type of work activity;
- tabulation of daily and weekly activities by hours;
- employee and supervisor signatures.

2.5 Expense Claim Form

The use of the Expense Claim Form must be coordinated with the Office Manual to ensure that allowances for travel (rate per kilometre), meals, etc., are fair and current. Receipts for expenses are usually attached to the form in order to substantiate expense claims.

Purpose
Expense claim forms are used as:

- part of normal accounting records which may be subject to audit;
- a record to prepare invoices for reimbursable expenses;
- a management tool for project budgeting.

Content
Expense Claim Forms should include the following information:

- name of claimant;
- time period;
- approval signature (if required);
- purpose of expense;
- project name and number;
- itemized list of expenses (with receipts):
  - travel (mode, distance, and destination);
  - parking;
  - meals;
  - lodging;
  - other out-of-pocket expenses;
- amount of advances;
- total amount claimed;
- signature of claimant.

2.6 Purchase Order

This form is not normally used by architectural firms, although it may be common place in larger organizations or institutions where architects are employed.

Purpose
A Purchase Order creates a contract between the organization practice and the supplier. It also:

- outlines the terms and conditions of the purchase;
- helps control overhead costs within the firm;
- provides a record of material and equipment (reconciliation or a type of partial inventory).

Content
A Purchase Order Form should contain the following information:

- name of supplier and purchaser;
- purchase order number;
- method of shipment;
- quantity and description of product;
- unit price and total price, including taxes;
- conditions of purchase (warranties, support, delivery schedules, etc.);
- project name and number (if applicable).

Purchase order forms are often pre-printed and sequentially numbered to control purchases. Some organizations advise their suppliers that invoices will not be paid without an authorized purchase order.

3. Forms and Stamps for the Management of the Practice

3.1 Project Directory

The project directory, which includes all projects undertaken by the architectural practice, is helpful as:

- a list to use as a filing reference;
- identification of senior staff responsible for each project;
- a reference for the date of project commencement;
- a management tool;
- a financial management tool, if it provides the following additional information:
  - construction value;
  - indication of the percentage of completion for the project.

3.2 Office Stamps

Each architectural practice should prepare a series of electronic stamps or notes which are used to indicate the status of a document or drawing. In the past is was common to apply these notations using rubber stamps with a separate ink pad or self-inking stamps and this is still applicable for paper communications received by mail.

The following are some common stamps used in an architectural practice:

3.2.1 *Received/Routing Stamp*

Purpose
This stamp registers the date of receipt of all incoming documents (correspondence, trade journals, catalogues, transmittals, drawings, etc.).

This stamp can also be used to indicate the routing or circulation of the document.

Content
The following are two samples:

Logo or Name of Architectural Practice

Date Received:

File or Project No.:

Routing:

Action:

Logo or Name of Architectural Practice

Date Received:

File or Project No.:

Routing:

3.2.2 *Other Stamps*

Other useful stamps are illustrated below.



Logo or Name of Architectural Practice

Employment Agreement

This Agreement is made:

Between the Employer:

_____

and the Employee:

_____

The Employer and Employee agree as follows:

1. *Term of Employment*

   The employment of the Employee shall commence on the date of this agreement and continue for an indefinite term until terminated in accordance with the provisions of this agreement.

2. *Probation*

   The parties hereto agree that the initial _____ month period of employment under this agreement is "probationary" in the following respects:

   (a) the Employer shall have an opportunity to assess the performance, skills, and other employment-related attributes and characteristics of the Employee;

   (b) the Employee shall have an opportunity to learn about both the Employer and the position of employment;

   (c) either party may terminate the employment relationship at any time during the initial probationary period without advance notice or cause, in which case there will be no continuing obligations of the parties to each other, financial or otherwise.

3. *Compensation*

   In consideration of the services to be provided by the Employee hereunder, the Employee, during the term of employment, shall be compensated as set out in the attached Schedule "A" which forms a part of this agreement, less applicable statutory deductions.

4. *Termination of Employment*

   Subsequent to completion of the probationary term of employment referred to in paragraph 2 herein, the Employer may terminate the employment of the Employee at any time:

   (a) for cause at common law, in which case the Employee is not entitled to any advance notice of termination or compensation in lieu of notice;

   (b) without cause, in which case the Employer shall provide the Employee with advance notice of termination or compensation in lieu of notice equal to:

   _____ week(s), or _____ week(s) per full year of completed service with the Employer, whichever is greater, to a maximum of _____ weeks.

   The Employee may terminate his or her employment at any time by providing the Employer with advance notice of his or her intention to resign equal to:

   _____ week(s) plus _____ week(s) per full year of completed service with the Employer, to a maximum of _____ weeks.

5. *Restrictive Covenant*

   Following the termination of the employment of the Employee by the Employer, with or without cause, or by the voluntary withdrawal by the Employee from the Employer, the Employee shall, for a period of _____ month(s) following the said termination or voluntary withdrawal, within the province of _____ refrain from either directly or indirectly soliciting or attempting to solicit the business of any client of the Employer for his or her own benefit or that of any third person or organization. (For the purpose of this provision, a client means any active client or prospective client with whom the Employer was engaged or was pursuing engagement at any time during the period of two years prior to the date of termination.) The Employee covenants that he/she will refrain from either directly or indirectly attempting to obtain the withdrawal from the employment of the Employer of any other Employee of the Employer having regard to the same geographic and temporal restrictions. The Employee shall not directly or indirectly divulge any financial information relating to the Employer or any of its affiliates or clients to any person whatsoever. The Employee shall respect the Employer's copyright. The Employee shall not take any documents or materials of the Employer without written permission.

6. *Confidentiality*

The Employee acknowledges that, in the course of performing and fulfilling his or her duties thereunder, he or she may have access to and be entrusted with confidential information concerning the present and contemplated financial status and activities of the Employer, and that the disclosure of such confidential information to competitors of the Employer would be detrimental to the interest of the Employer. The Employee further acknowledges and agrees that the right to maintain the confidentiality of such information constitutes a proprietary right which the Employer is entitled to protect. Accordingly, the Employee covenants and agrees with the Employer that he or she will not, during the continuance of this agreement, disclose any of such confidential information to any person, firm or corporation, nor shall he or she use same, except as required in the normal course of his or her engagement hereunder, and thereafter he or she shall not disclose or make use of same.

7. *Assignment*

This agreement shall be assigned by the Employer to any successor employer and shall be binding upon the successor employer. The Employer shall ensure that the successor employer shall continue the provisions of this agreement as if it were the original Employer. This agreement may not be assigned by the Employee.

8. *Severability*

Each paragraph of this agreement shall be and remain separate from and independent of and severable from all and any other paragraphs herein except where otherwise indicated by the context of this agreement. The decision or declaration that one or more of the paragraphs are null and void shall have no effect on the remaining paragraphs of this agreement.

9. *Notice*

Any notice required to be given hereunder shall be deemed to have been properly given if delivered personally or sent by registered mail to:

Employer at

_____

_____

_____

Employee at

_____

_____

_____

10. *Indemnification*

The Employer hereby agrees to save harmless and indemnify the Employee, his or her heirs, executors, and administrators against any liability arising out of or in respect of any error, omission or negligent act in the performance by the Employee of professional services (other than intentional acts) on behalf of the Employer and to pay on the Employee's behalf out of the funds of the Employer all sums which the Employee becomes liable to pay as damages, interests, costs, fees and expenses, as a result of or sustained or incurred in or about any action, against the Employee or the Employer whether before or after the termination of employment and to defend the Employee in any such action, suit or proceeding at the expense of the Employer and to make no claim against the Employee with respect thereto for contribution or indemnity.

11. *Interpretation of Agreement*

The validity, interpretation, construction, and performance of this agreement shall be governed by the laws of the province of _____. This agreement shall be interpreted with all the necessary changes in gender and in number as the context may require and shall enure to the benefit of and be binding upon the respective successors and assigns of the parties hereto.

12. *Schedule "A"*

Compensation and general conditions of employment are appended to and form part of this agreement.

In witness whereof the parties hereto have read and understand this agreement and acknowledge that they have had the opportunity to obtain independent legal advice in respect of it and have duly executed this agreement as of _____.

_____

(witness) **(employer)**

_____

(witness) **(employee)**

SCHEDULE "A" COMPENSATION AND GENERAL CONDITIONS OF EMPLOYMENT

A.1 Position

The employment position is:

_____

A.2 Hours of Work

Hours of work are:

_____
_____
_____
_____
_____

A.3 Vacation with Pay

Terms of vacation are:

_____
_____
_____

Should the employment be terminated with vacation time earned but not taken, the Employer shall pay the Employee the vacation pay.

Terms of earning additional vacation with pay as the length of employment increases are:

_____
_____
_____

A.4 Public Holidays

The Employee is granted paid holidays for all statutory holidays, including New Year's Day, Good Friday, Victoria Day, Canada Day, August Civic Holiday, Labour Day, Thanksgiving Day, Christmas Day, Boxing Day, and _____ (adjust statutory holiday as per provincial law).

A.5 Personal Leave

Terms of personal leave are:

_____
_____
_____

A.6 Bereavement Leave

Terms of bereavement leave are:

_____
_____

A.7 Pregnancy and Parental Leave

Pregnancy and parental leave shall be granted in accordance with the requirements of the applicable provincial legislation.

A.8 Benefits Plans

❑ The Employer does not offer a benefit plan.

or

❑ The Employer offers the Benefit Plan described in the attached Schedule "C" for the Employee.

A.9 Profit Sharing

❑ The Employer does not offer a profit-sharing plan.

or

❑ The Employer offers the profit-sharing plan described in the attached Schedule "C" for the Employee.

A.10 Professional Fees

The Employee shall maintain membership in good standing in the following groups:

_____
_____
_____
_____

The Employer *shall/shall not* compensate the Employee the cost of maintaining membership in the foregoing groups.

A.11 Performance Evaluation

The Employer shall assess the Employee's performance at the end of the probationary period and annually thereafter during the month of _____. The Employer and Employee shall meet and discuss the Employee's performance, compensation, and other conditions of employment.

A.12 Career Development

Terms of career development are:

A.13 Compensation

Terms of compensation are:

A.14 Overtime Work

Terms of overtime work are:

A.15 Expenses

Terms of Reimbursement of Expenses are:

A.16 Equipment

A.17 Other Conditions

A.18 Amendments

Invoice

Name of Project: _____ **File #:** _____

Invoice: _____

O.C. 2402 — Class II Building
from $1,300,000 to $3,200,000

fee excluding expenses $86,582

Overall Work	**Fees: Basic Service**					$86,582	**1082**
	Estimated cost of work *including taxes under sec. 21*				$1,718,290		
	Fees: plans and specifications						
	for the first 1,300,00				$47,325		
	plus	3.19%					
	on remaining funds	$418,290			$13,343		
						$60,668	**758**
		Preliminary design	40%	$24,267			114 — 15% Preliminary Design
							190 — 25% Design Development
		Plans and specifications	60%	$36,401			455 — 60% Plans and Specs
	Fees: field review services						
	up to 1,300,00				$20,225		
	plus	1.36%					
	on remaining funds	$418,290			$5,689		
						$25,915	**324**
	Forseeable additional fees					$0	
	Surveys			maximum	$0	$0	
	Preparatory studies			maximum	$0	$0	
	Programming			maximum	$0	$0	
	Change order services			provision	$0	$0	
	Specialized equipment				$0	$0	
	Phasing (on fees for plans and specifications, and supervision)		0$	on	$86,582	$0	
	Eligible expenses					$0	
	Specific Expenses				$0	$0	
	Travel	O.C. rate		maximum	$0	$0	

Form 2.1 Sample A

Logo or Name of Architectural Practice

Invoice

To: Acme Co. Ltd.
77 Skyway Drive
Anytown, ON
Y2K 2Y2

INVOICE No.: 09094
Project: Acme Office Addition
Project No.: 09051
Date: 16 October 2009
GST No.: R109976007

For Professional Services Rendered:

- Reference: Client-Architect Contract
  RAIC Document Six, dated May 29, 1998

Fees to: 15 October 2009 • Earned to date:

Design	100% of 25% of 8% of $200,000	$4,000.00
Contract Documents	100% of 50% of 8% of $220,000	$8,800.00
Contract Administration Services	60% of 25% of 8% of $241,820	$2,901.84

Additional Services

Change Orders 1, 2, and 3
6 hours @ $180/hour = $1080
15 hours @ $75/hour = $1125
$2,205.00

Total fee earned to date	$17,906.84
Less previously invoiced	$16,084.76
TOTAL FEE DUE THIS INVOICE	$1,822.08
Reimbursable expenses due (excluding GST) (see Schedule A attached)	$104.60
Sub-total	$1,926.68
GST	$96.33
TOTAL DUE THIS INVOICE	$2,023.01

Logo or Name of Architectural Practice

Schedule A

Invoice (continued)

To: Acme Co. Ltd.
77 Skyway Drive
Anytown, ON
Y2K 2Y2

INVOICE No.: 09094
Project: Acme Office Addition
Project No.: 09051
Date: 16 October 2009
GST No.: R109976007

Reimbursable Expenses:

- Previously invoiced $754.55

- Current Expenses

Travel	$26.50
Photocopies (39 @ $0.15 ea)	$5.85
Printing (11 prints @ $1.25 ea)	$13.75
Long distance calls	$27.66
Postage and delivery	$17.20

- Sub-total $90.96
  Administrative charges (15% of $90.96) $13.64

Total Expenses to date	$859.15
Expenses due this invoice	$104.60

Logo or Name of Architectural Practice

Fee Calculation Sheet

Project No.: **Date:**

Client:

Sub-consultants

DISCIPLINE	Firm NAME	FEE
Structural		
Mechanical		
Electrical		
Other		
	Sub-total	

In-house Costs

PHASE	HOURS and Rate*	Payroll Cost	Sub-total
Pre-design	1.		
	2.		
Schematic Design	1.		
	2.		
Design Development	1.		
	2.		
Construction Documents	1.		
	2.		
	3.		
	4.		
Bidding & Contract Negotiations	1.		
	2.		
Construction Administration	1.		
	2.		
Post-construction	1.		
Other	1.		
Total Payroll Cost			

Other costs

Sub-consultant's fees

TOTAL FEE Estimate

Comparison with percentage fee of construction cost:

Estimated Construction Value:

**Hourly rates include overhead and profit*

Logo or Name of Architectural Practice

Project Cost Control Chart

Project: Addition & Renovations to Brooks Clinic

Project No.: 09-07

Date: December 09

Fee available to project (budget): $117,070.00

CODE	ACTIVITY	%	DOLLARS	HOURS	$/HOUR
1.	Pre-design/meetings	0.0%	$0	0	$125.00
2.	Programming/analysis	0.0%	$0	0	$0.00
3.	Schematic Design	15.0%	$16,800	168	$100.00
4.	Design Approvals	0.0%	$0	0	$100.00
5.	Design Development	15.0%	$16,800	168	$100.00
6.	Construction Documents	45.0%	$53,635	631	$85.00
7.	Specifications	0.0%	$0	0	$85.00
8.	Building Permit/Approvals	0.0%	$0	0	$85.00
9.	Tendering/Negotiations	5.0%	$5,950	70	$85.00
10.	Contract Administration	20.0%	$23,885	281	$85.00
11.	Client Revisions	0.0%	$0	0	$85.00
12.	Extra Services	0.0%	$0	0	$85.00
13.	Post-construction/occupancy	0.0%	$0	0	$85.00
14.	Construction/Management	0.0%	$0	0	$85.00
15.	Estimating	0.0%	$0	0	$85.00
16.	Interior Design	0.0%	$0	0	$85.00
17.	Drawing and Document Assembly	0.0%	$0	0	$85.00
18.					
19.					
20.					
TOTALS		100.0%	$117,070	1,318	

Logo or Name of Architectural Practice

Time Report

Name: John Doe **No.:** 164 **Dept.:** Production **Week Ending:** 15 Oct. 09

Project:	Project No.:	Activity Code:	Sat.	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Total
Statutory Holiday		2			7½					7½
ACME Offices	99-175	8				5	4	1	7½	17½
		9					3			3
	99-175	13					1½			1½
Miller Addition	99-192	6				2½		2		4½
Tyler Clinic	99-164	10						6		6
Regular					7½	7½	7½	7½	7½	37½
Overtime							1	1½		2½
Total					7½	7½	8½	9	7½	40

Activity Codes

1. Illness/Absent
2. Vacation/Holiday
3. Office Overhead
4. Promotion
5. Pre-design/Requirements
6. Schematic Design
7. Design Development
8. Working Drawings
9. Specifications
10. Contract Administration — Office Functions
11. Contract Administration — Field Functions
12. Post-construction
13. Additional Services

Signature of employee

Signature of supervisor

Logo or Name of Architectural Practice

Expense Claim Form

Claimant: John Doe **Period covered by report:**

Approved by: **From:** 1 Sept. 08 **To:** 31 Oct. 08

Date:	Project No.:	Details:	R*	Expense
21 Sept. 08	08-034	Travel to site, 20 KM @ .32¢/KM	R	6.40
23 Sept. 08	08-034	Travel to Millwork shop to		
		inspect cabinets, 35 KM @ .32¢/KM	R	11.20
28 Sept. 08	08-032	Travel to site, 15 KM @ .32¢/KM	R	4.80
4 Oct. 08	08-075	Plane fare to Ottawa	R	368.50
4 Oct. 08	08-075	Lunch		9.50
4 Oct. 08	08-075	Taxi	R	6.75
5 Oct. 08	08-164	Travel to site, 20 KM @ .32¢/KM		6.40
5 Oct. 08	08-175	Travel to ACME, 25 KM @ .32¢/KM		8.00
			Total	**$** 421.55

R*: Recoverable from Client. Invoice reimbursable expenses for this amount.

Settlement:

Personal Charges: Magazine Renewal	$ 18.00
Temporary Advance: Plane Ticket Plus $20.00	$ 388.50
Subtracted from Expenses:	$ 406.50
Payment:	**$** 15.05
Cheque No.:	

2.3.1 Management of the Project



Canadian Handbook of Practice for Architects

2.3.1

Introduction

Project Organization
- In-house Teams

Role of the Project Manager
- Client-Architect Agreements
- Project Cost Control
- Coordinating Engineers and Other Consultants
- Communications

Scheduling the Project

Project Closeout
- Project Evaluation
- Record Drawings
- Archiving
- Firm Database
- Promotional Documentation

Use of the "Checklist for the Management of the Architectural Project"

References

Appendix — Characteristics of an Effective Project Manager

Checklist for the Management of the Architectural Project

Management of the Project

Introduction

Effective management of the project is an essential element of good professional practice.

This chapter describes the role of the project manager (also called a project architect or design team leader) — the person in an architect's office who directs and administers an architectural project. Sometimes the project manager may be the principal or partner-in-charge or they may report to the principal or partner-in-charge.

This chapter does **not** cover:

- *project management* as a separate professional service or form of delivery;
- *construction management* as a form of project delivery.

These topics are discussed in Chapter 2.3.2, *Types of Construction Project Delivery*.

The project manager may be a senior architect or other individual (preferably an architect) with experience in the practice of architecture and management.

Refer to "Appendix — Characteristics of an Effective Project Manager" at the end of this chapter.

Refer also to the standards of the Project Management Institute which provide a structured methodology for project management at www.pmi.org

Project Organization

Good project management means:

- selecting and managing people, including in-house staff and outside consultants;
- ensuring continuous and effective communications;
- delegating tasks appropriately;
- arranging and managing meetings;
- controlling and managing design changes;
- managing time effectively;
- scheduling, estimating, and project control.

In-house Teams

For small projects, project managers may carry out several of the tasks themselves. For large and complex projects, several people participate in the same task. The project manager must identify the manpower and skills required, and must also constantly direct and motivate the in-house team. The composition of the team is the key factor in achieving both architectural and financial objectives.

The team may include the project manager and several architects, intern architects and technicians. More complex projects or very specialized services (such as acoustics, vertical transportation systems, architectural conservation, and wind studies) often require hiring outside experts.

Role of the Project Manager

The project manager is a leader responsible for:

- ensuring that the project proceeds through successive stages from program approval to project implementation;
- keeping the project on time and within budget;
- managing the progress of the project by:
  - directing an internal team;
  - directing and coordinating the contribution of engineers and other consultants;
  - achieving the firm's financial objectives;
- providing proper project closeout.

Client-Architect Agreements

The project manager should review the client-architect agreement before starting work.

It is preferable to use either the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six* or the *Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: RAIC Document Seven*, because:

- these agreements are widely recognized and accepted;
- the architect's and the client's responsibilities are clearly defined;
- they clearly identify the scope of work by distinguishing between Basic Services and Additional Services.

The prudent project manager will review the terms of the agreement, to fully understand the scope and limitations of the consulting services to be provided. This should forestall later misunderstandings or unreasonable expectations. The project manager should identify when any increase in fees as a result of additional services is warranted and then consult with the principal or partner-in-charge and assist in any adjustment to fees.

Refer to Chapter 2.1.9, *Risk Management and Professional Liability,* for more detail on client-architect agreements.

Project Cost Control

Generally, at the beginning of a project, the client will prepare an overall project budget. The project manager's goal is to:

- manage the results of the design team;
- administer the design and construction of the best possible project within the available funds;
- achieve the firm's financial objectives (profit margin) for the project.

Refer to Chapter 2.3.3, *Cost Planning and Control*, for information on planning and controlling costs for a specific project. Refer to Chapter 2.1.4, *Financial Management,* for controlling costs within the architectural office.

Coordinating Engineers and Other Consultants

Usually the "design team" has already been selected when the commission is awarded. Refer to Chapter 1.2.3, *Consultants,* regarding the role of consultants and agreements with consultants. Refer to Chapter 2.1.9, *Risk Management and Professional Liability,* for issues to consider when assembling the design team.

The project manager is responsible for:

- providing engineers and consultants with all information promptly and clearly in order to optimize their participation;
- ensuring that their designs and specifications are properly coordinated;
- maintaining morale as well as ensuring the respect and recognition of all consultants.

Communications

Managing communications throughout the entire project is crucial to its success. Good communications require the efficient and effective management of:

- meetings;
- telephone communications;
- electronic and paper messages such as correspondence, memos, E-mail;
- record-keeping, such as meeting minutes, notes, project files, and other documentation.

Refer also to Chapter 2.1.6, *Communications*.

Scheduling the Project

Project schedules are planning tools that help project managers and teams organize various defined tasks in order to meet deadlines or dates which may be set out in an agreed-upon schedule or in the contract. In addition, schedules help to monitor tasks until the project is complete. Although many different scheduling techniques are available for many types of projects, the project manager must select a method which can be adapted to the scale and complexity of the work.

Simple bar charts and milestone charts are usually appropriate for scheduling architectural projects. However, for complex projects with many teams and tasks, refer to the scheduling techniques outlined in "Appendix — Project Management" in Chapter 2.3.2, *Types of Construction Project Delivery*.

Project Closeout

Project Evaluation

The firm should assess whether the project has achieved its financial and professional objectives. This might include an external evaluation with the client. The project manager should analyze the project and, if the objectives were not met, determine why and suggest corrective action for future projects.

Record Drawings

If engaged for this service, the project manager will oversee the preparation of CAD record drawings for the client based on the contractor's "mark-ups" which show changes made to the construction documents. Also, the project manager should return to the client any documentation, such as construction drawings and specifications, which was provided as reference for the design of renovations or additions to an existing building.

Archiving

Project documents, including all electronic communications and record drawings, should be kept and filed so that they may be readily and quickly retrieved if they are needed for other projects or must be consulted in the event of a claim.

Firm Database

The project manager should extract any information which could be used to develop a database for future work, such as the preparation of construction cost estimates, or for re-usable construction details or specifications.

Promotional Documentation

Based on some of the project documents (such as sketches, perspectives, plans, and photographs) and data, project managers should prepare a "project record" or "project data sheet" that can be added to the firm's portfolio for future use. This record should highlight the project's special features and main challenges, as well as demonstrate the architect's contribution to its success. Refer also to Chapter 2.1.3, *Public Relations and Marketing*.

Use of the "Checklist for the Management of the Architectural Project"

A "Checklist for the Management of the Architectural Project" has been provided at the end of this chapter. The checklist is based on the Ontario Association of Architects former Practice Bulletin Number 67, *Architect's Project Progress Record*. The document has been reformatted, references to provincial terms have been modified, and minor editorial improvements have been included.

Although the design and management of architectural projects are not necessarily linear nor quantifiable, this checklist can assist the architect in scheduling and recording the status of principal tasks during the course of a project.

References

The American Institute of Architects (AIA) and David S. Haviland. Washington, D.C.: The AIA Press.

Managing Architectural Projects: Three Case Studies. 1981.
Managing Architectural Projects: The Effective Project Manager. 1981.
Managing Architectural Projects: The Project Management Manual. 1984.

Demkin, Joseph A., executive editor. *The Architect's Handbook of Professional Practice*. The American Institute of Architects. Hoboken, New Jersey: John Wiley & Sons, Inc. 2008.

Project Management Institute. A Guide to the Project Management Body of Knowledge –Third Edition. Project Management Institute, 2004.
www.pmi.org

Appendix — Characteristics of an Effective Project Manager

Whether a principal or an employee, the effective project manager:

- attacks aggressively every problem on design projects;
- is organized: plans, organizes, directs, and controls the entire project;
- is enthusiastic about achieving high design standards, budget control, and schedule performance for the client;
- delegates well;
- communicates well with each person on the team and with the client and other people outside the firm;
- motivates the staff to perform so that project goals are met;
- has the ability to modify a project so that it can meet a client's changing goals;
- is results-oriented, keeping the final outcome of the project in mind at all times and achieving every goal that has been established;
- knows that it takes an entire architectural design team to accomplish the greatest possible results on a project and gives proper credit to the design team;
- listens well to both team members and others involved in a project in order to interpret clearly their objectives and opinions;
- can convince clients and team members of the right way for the project to proceed and can persuade others in a pleasing and nonbelligerent manner;
- always has a conscious sense of time: knows exactly how much time it takes to accomplish a task and how much time is left to accomplish remaining tasks;
- is capable of managing multiple projects without letting the requirements or details of any one project fall through the cracks;
- knows where to find the answers for all technical problems and can converse intelligently with clients, internal team members, and external building officials and consultants about any aspect of the project.

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Checklist for the Management of the Architectural Project

Periodic Tasks to be undertaken throughout every phase of the Project

TASK/PHASE	Pre-agreement	Schematic Design	Design Development	Construction Documents	Bidding and Negotiating	Contract Administration	Post-construction
Review and update project schedule							
Maintain project accounting records							
Review internal office budget							
Submit monthly or periodic invoices to client							
Update project directory							
Update project brief							
Review and approval by Authorities Having Jurisdiction							
Review and coordinate with consultants							
Update estimate of construction cost							
Obtain client approvals							

Pre-agreement	Schematic Design	Design Development	Construction Documents	Bidding and Negotiation	Contract Administration	Post-construction

Checklist for the Management of the Architectural Project

Tasks for each phase of the project

I Pre-agreement Phase

Upon receipt of notification from a prospective client, undertake the following tasks prior to a submission or execution of an agreement.

1.	**Determine if other architects are or were involved with the project.**		
	If "yes," comply with provincial association requirements.		
	Address issues pertaining to copyright, credits, liability.		
2.	**Assign project number.**		
3.	**Determine scope and type of project.**		
4.	**Verify ability to provide professional services, including professional liability insurance requirements and licensing.**		
5.	**Determine if the client is financially sound.**		
6.	**Make preliminary assessment of project viability:**		
	• special considerations		
	• financing		
	• economics		
	• social or community groups		
	• zoning/development approval		
	• environmental impact		
	• heritage designation		
	• Sustainable targets		
	• other		
7.	**Determine required professional services.**		
8.	**Determine type of professional services agreement:**		
	• Standard Form of Agreement (Document Six)		
	• Abbreviated Version of Agreement (Document Seven)		
	• client's contract		
	• identify special provisions which may require input of legal counsel or professional liability insurers		
9.	**Ascertain method of construction contract.**		
	.1 Traditional Bid Process:		
	• single bid package		
	• multiple bid packages (how many?)		
	• direct selection by the client		
	• invited bidders		
	• open bidding		
	.2 Construction Management		
	.3 Design-Build		
	.4 other		

10. Review the client's budget and resources.		
Determine if budget includes:		
A. General		
• land or site acquisition		
• demolition		
• renovation		
• real estate fees		
• legal fees and/or title search		
• legal survey		
• environmental audit		
• environmental remediation		
• financing		
• property taxes, levies, etc.		
• project management fees		
• professional fees (architecture and engineering)		
• permits		
• estimated construction costs:		
• off-site utilities		
• on-site utilities		
• demolition		
• base building		
• tenant improvements		
• furniture/equipment		
• landscaping		
• items purchased by the client		
• allowances:		
• artwork		
• hardware		
• interior finishes (e.g., carpet)		
• exterior finishes (e.g., brick)		
• landscaping		
• service connection costs		
• other		
B. Authorities Having Jurisdiction		
• official plan amendment		
• zoning or land use amendment		
• bylaw variance or development appeal		
• site plan agreement		
• demolition permit		
• construction permit(s)		
• municipal/regional fees (utility connections, park levies)		
• other		
C. Consultants' Fees		
• planning		
• civil engineering		
• architecture		
• structural		
• mechanical		
• electrical		
• landscape architecture		
• interior design		
• cost consultant or quantity surveyor		
• other		
D. Special Consultants' Fees		
• acoustical		
• architectural conservation		
• arborist		
• art		
• building code		
• building envelope		
• commissioning		
• construction management		
• energy		
• environmental contaminate		
• food service		
• furniture/equipment		
• geotechnical		
• hardware		
• marketing		
• security		

D. Special Consultants' Fees (continued)		
• seismic		
• signage — graphics		
• special lighting		
• surveyor		
• sustainability		
• traffic		
• wind/snow studies		
• other		
E. Miscellaneous costs		
• contingency		
• inspection and testing:		
• soil		
• concrete		
• steel		
• roofing		
• asphalt paving		
• building audit (condominiums)		
• other		
• adjacent building damage survey		
• geotechnical report/inspection		
• models/professional renderings		
• full-size mock-ups		
• inflation		
• financing costs		
• client disbursements		
• consultant disbursements		
• other		
F. Insurance		
• excess professional liability		
• property damage		
• builder's risk insurance		
• other		
11. Determine the client's requirements for:		
• approvals		
• CADD		
• unit of measurement (imperial/metric)		
• language translation		
• other		
12. Determine whether project budget, project time schedule, and project program are compatible.		
13. Organize teams (structural, mechanical, electrical, and special consultants).		
Negotiate tentative compensation in accordance with basis of services determined above.		
Verify consultants' abilities to meet the client's requirements:		
• time schedule		
• liability insurance		
• licensing requirements		
• construction cost estimates		
• other		
14. Prepare project estimate in accordance with agreement:		
• internal office budgets		
• production schedules		
• personnel		
15. Determine fee (refer to Form 2.2, Fee Calculation Sheet, in Chapter 2.2).		
16. Prepare and forward interim Letter of Agreement.		
17. Prepare client-architect agreement and forward to the client for review.		
Direct legal counsel and professional liability insurer (as appropriate) to review any modifications or specific provisions required by the client.		
18. Review final agreement with own legal counsel and professional liability insurer (if necessary). Approve any modifications made by the client, or renegotiate.		
19. Verify authority of party signing for the client (required for public agency, institutional, and corporate clients).		
20. Execute the agreement.		
21. Prepare project directory (refer to Form 1.5, Project Team Directory, in Chapter 2.4).		

II Schematic Design Phase

Part A — *Tasks prior to starting the schematic design phase*

1. Obtain name of the client's authorized representative.		
2. Obtain the client's project brief.		
Confirm the client's space needs and other program requirements.		
3. Establish project filing system.		
4. Assign personnel to the project:		
• project architect		
• designer		
• technical staff		
• other		
5. Assemble and review all applicable requirements of Authorities Having Jurisdiction (e.g., site plan control, applicable zoning or land use, and code requirements).		
Review with Authorities (refer to Chapter 1.2.4).		
6. Establish project schedule, including completion dates for each phase of project.		
Advise the client, staff, and all consultants.		
7. Finalize Consultant Agreements **Negotiate, prepare, and execute consultant agreements. When required, obtain the client's approval of consultants:**		
• structural		
• mechanical		
• electrical		
• other		
Request and receive from each consultant proof of professional liability insurance coverage:		
• structural		
• mechanical		
• electrical		
• other		
Request and receive from each consultant proof of professional liability insurance coverage:		
• structural		
• mechanical		
• electrical		
• other		
8. Distribute copies of pertinent portions of client-architect agreement to staff and consultants who require copies.		
9. Distribute copies of pertinent portions of consultant agreements to staff members who require copies.		
10. Confirm unit of measurement:		
• imperial		
• metric		
11. Obtain, from the client, the following surveys:		
• legal		
• topographical		
• other		
Assist the client in securing surveys when necessary.		
Advise the client to obtain adjacent building condition survey when necessary.		
12. Obtain the consultants' requirements for investigation and testing necessary for proper execution of their work and request approval from the client.		
Assist the client in securing proposals for this work.		

Part A — *Tasks prior to starting the schematic design phase* (continued)

13. Instruct consultants to review site information and report: • structural		
• mechanical		
• electrical		
• civil		
• other		
14. Instruct appropriate staff members and other consultants to review site information and examine site.		
Instruct appropriate staff and consultants to review and record existing conditions for existing building.		
15. Determine preliminary space requirements (area and volume) using the client's functional program.		
16. Prepare functional program, if part of architectural services.		
17. Review functional program with the client to determine if construction budget and program are compatible.		
18. Obtain the client's written authority to proceed.		

Part B — *Tasks to be started after completion of Part A*

1. Initiate project brief.		
2. Review all assembled data, including program, budget, requirements of Authorities Having Jurisdiction, site data, and special requirements.		
3. Prepare functional space diagrams.		
4. Provide consultants with pertinent program data and functional space requirements.		
5. Receive and review results of all investigations and tests, including geotechnical reports and analyses.		
Request additional information, if necessary.		
Forward final information to appropriate consultant(s).		
6. Confer with consultants to determine systems to be used in the project.		
Obtain analyses of comparative systems, with recommendations.		
Obtain space and location requirements for selected systems, after review and acceptance by the client.		
7. Prepare schematic design documents in compliance with applicable codes, including: • site plan		
• principal floor plans		
• building sections		
• general descriptive views (elevations)		
• illustrative sketches, models or renderings		
• other		
8. Identify all documents with project number and date, and name of the practice.		
9. Calculate areas and volumes.		
Analyze plan efficiency and applicable net-to-gross ratios.		
10. Update project brief to include system and equipment descriptions.		
11. Obtain from each consultant an estimate of construction cost for their system or components: • structural		
• mechanical		
• electrical		
• civil		
• other		
12. Prepare written estimate of construction cost based on all available data. Include appropriate contingencies.		
13. Submit schematic design documents, including drawings, project brief, calculations, and estimate of construction costs to the client.		
14. Obtain the client's written authorization to proceed to design development phase, and funding agency approval where applicable.		

III Design Development Phase

Part A — *Tasks prior to starting the design development phase*

1. Review schematic design checklist to ensure phase completion and that all required data have been obtained.		
2. Have the client provide any additional requirements and confirm in writing.		
3. Assist the client in obtaining models, perspectives or professional renderings when requested.		
4. Review program and verify compliance.		
5. Review schematic documents for compliance with all applicable codes and regulations.		
6. Select additional consultants, if required, and establish contractual relationship.		
Obtain the client's written approval as required.		
7. Review all other data received from the client, consultants, etc.		
Request additional data if necessary.		
8. Obtain the client's standards and requirements, if any, for drawings and for other material.		
Check against requirements of Authorities Having Jurisdiction.		
9. Develop and forward to consultants, or alternatively obtain from consultants, a list of specialized systems required, such as:		
• cable TV		
• clock		
• closed circuit TV		
• compressed air		
• electronic or communication systems		
• energy management system		
• fire suppression systems		
• gas		
• intercom		
• lighting		
• lightning protection		
• oxygen		
• photovoltaic		
• pneumatic tube		
• remote control operations		
• security		
• steam		
• telephone		
• vacuum		
• voice communication		
• waste recycling and storage		
• other		
Obtain the client's approval of list and notify consultants of approval or revisions.		
10. Define occupancy load for each area and forward to consultants.		
11. Instruct the structural consultant to investigate and confirm in writing a review of applicable codes and regulations.		
12. Instruct the mechanical and electrical consultants to: • contact utility companies and public authorities regarding all services, and receive written approval for all service connections;		
• investigate and confirm in writing their review of all applicable public and utility regulations;		
• review architectural and structural schematic drawings to establish adequate provision for specialized systems;		
• prepare estimates of operating costs with recommendations.		
13. Review the consultants' estimates of operating costs and forward to the client.		
Obtain the client's approval of selected energy source.		

Part B — *Tasks during the design development phase*

1. Prepare site plan indicating building location(s) and site improvements.		
2. Prepare all other necessary drawings:		
• plans		
• elevations		
• sections		
• schedules		
• other		
3. Prepare area calculations (net and gross) and volume calculations, including site coverage and density, as defined in zoning/land use regulations.		
4. Prepare preliminary or outline specifications:		
• architectural		
• structural		
• mechanical		
• electrical		
• civil		
5. Instruct consultants to prepare layouts and drawings as required to illustrate and describe their portion of project:		
• architectural		
• structural		
• mechanical		
• electrical		
• civil		
6. Obtain detailed cost estimate, if specifically authorized by the client as part of architectural services:		
• architectural		
• structural		
• mechanical		
• electrical		
• civil		
7. Direct each consultant to prepare an estimate of construction cost for their discipline:		
• architectural		
• structural		
• mechanical		
• electrical		
• civil		
8. Update estimate of construction cost.		
9. Submit design development documents, including drawings, outline specifications, and updated estimate of construction cost to the client.		
10. Have the client confirm type of construction contract required.		
11. Obtain the client's written approval of design development documents.		
Revise as required.		
12. Obtain the client's written authorization to proceed to construction documents phase.		
Verify, where applicable, that all authorities and agencies have given authorization to proceed.		

IV Construction Documents Phase

Part A — *Tasks prior to starting the construction documents phase*

1. Review checklist for previous phase to ensure completion.		
Review program and verify compliance.		
2. Review design development documents for compliance with applicable codes and regulations.		
3. Select additional consultants, if required, and establish contractual relationships.		
Obtain the client's approval as required.		
4. Determine scope of drawings, including selection of software, schedule of required drawings, sequence of drawings, information to appear on each sheet, scale, and sheet size, etc.		
Review requirements of the client and authorities.		
5. Determine method of production drawing set.		
Determine drawing requirements for type of construction procurement (bid, multiple bid, Design-Build).		
6. Develop title block format and layering system.		
Check the client's requirements.		
7. Establish check set review schedule with client, consultants, and authorities.		

Part B — *Tasks during the construction documents phase*

1. Prepare final specifications and drawings to include plans (including site plan and landscaping), elevations, sections, details, notes, dimensions, and schedules, and require all consultants to do the same.		
2. Arrange for preparation of finish hardware schedule, if required.		
3. Identify components requiring alternate prices.		
4. Determine acceptable alternatives to specified materials or systems.		
5. Identify components requiring unit prices.		
6. Determine required cash allowances:		
• testing allowance		
• contingency		
• utility connections		
• other		
7. Prepare colour and finish schedules.		
8. Prepare testing and quality control program budgets, and assist the client in selection of testing agencies.		
Determine if these costs are to be included in the construction contract.		
9. Obtain the client's instructions regarding application and payment of necessary permits such as building, etc.		
10. Obtain the client's instructions regarding insurance and bonds.		
11. Obtain the client's instructions regarding construction contracts and bidding procedures.		
12. Obtain the client's requirements for phased occupancy or other special requirements.		
13. Determine items or work to be furnished by the client, or not to be included in the construction contract.		
14. Review, with the client, the schedule for delivery and installation of client-furnished materials.		
15. Review bid period in project schedule.		
Determine time, date of bid closing, and place of bid receipt.		
16. Prepare and assemble specifications concurrently with preparation of drawings. Include:		
• notice to bidders		
• advertisement or invitation to bid		
• instructions to bidders		
• bid form		
• construction contract		
• General Conditions		
• Supplementary Conditions		
• cash allowances		
• other		

Part B — *Tasks during the construction documents phase* (continued)

17. Submit copies of General Conditions and Supplementary Conditions for the client's review or obtain the client's specific contract requirements.		
18. Assist the client's legal counsel or representative, if necessary, with review of:		
• General Conditions		
• Supplementary Conditions		
• form of construction contract		
19. Check completed documents for coordination, compliance with program, accuracy, and cross-coordination with consultants' work.		
Direct the consultants to carry out required coordination:		
• architectural		
• structural		
• mechanical		
• electrical		
• other		
20. Revise documents as required after check and instruct consultants to do the same:		
• architectural		
• structural		
• mechanical		
• electrical		
• other		
21. Prepare final calculations of net and gross area, and volume.		
22. Obtain from each consultant further update of estimate of construction cost:		
• architectural		
• structural		
• mechanical		
• electrical		
• other		
23. Prepare final estimate of construction cost.		
24. Submit drawings, specifications, estimate of construction cost, and building calculations and analyses to the client for review.		
Obtain the client's written approval.		
Revise as required.		
25. Review list of potential contractors with the client.		
26. Obtain qualification statements, if required, from interested bidders and review.		
Obtain assistance from consultants if separate prime contracts are to be awarded.		
27. Stamp documents for intended purposes (e.g., bid, building permit, construction).		
Affix the architect's seal and signature and date on documents. Ensure that consultants seal, sign, and date documents:		
• architectural		
• structural		
• mechanical		
• electrical		
28. Assist the client in filing documents for approvals and permits.		
29. Obtain the client's written authorization to proceed to bidding or negotiation phase.		

V Bidding and Negotiation Phase

Part A — *Tasks during the bidding and negotiation phase*

1. For open bidding:		
Assist the client in publishing the advertisement for bids. If separate contracts are to be awarded, separate advertisements may be necessary.		
Obtain qualification statements from interested bidders and review.		
2. For invited bidding:		
Notify selected bidders.		
3. For direct selection:		
Assist the client in selection as requested.		
4. Determine number of sets of bid documents required and order same.		
Review client-architect agreement for agreed-upon number of sets (if applicable).		
5. Distribute documents to bidders and obtain deposits.		
6. Issue documents to local construction association for viewing.		
7. Hold pre-bid meeting and site tour as required.		
8. Record all bid document inquiries.		
9. Prepare and issue addenda as necessary. Ensure that the bidders have a reasonable amount of time to review prior to bid closing.		
10. Return deposit to bidders who withdraw upon satisfactory return of bid documents.		
11. Return deposit to disqualified bidders upon satisfactory return of bid documents.		
12. Receive, open, tabulate, and analyze bids as per procedure established with the client. Obtain assistance of consultants as required.		
13. Advise the client on selection of alternatives, separate prices.		
Review bids and analysis with the client.		
Obtain the client's instructions.		
14. Notify successful bidder of acceptance and basis of acceptance.		
15. Update project directory.		
16. Assist the client in issuing letter of intent if contract cannot be executed immediately.		
17. Notify unsuccessful bidders and obtain return of bid documents.		
18. Return unsuccessful bidders' deposit upon satisfactory return of bid documents. (Retain bid deposit of lowest bidders until contract signing.)		
19. Request and receive submission of post-bid information:		
• performance bond		
• labour and material payment bond		
• insurance certificates		
• workers compensation		
• other		
20. Prepare or assist the client's legal counsel in preparation of construction contract. If separate contracts are awarded, obtain assistance of consultants as required.		
21. Assist the client and contractor in execution of the construction contract.		

VI Contract Administration Phase

Part A — *Tasks to be completed prior to start of construction and after execution of contract(s)*

1. Hold pre-construction meeting with client and contractor to clarify special requirements and contract administration procedures		
2. Request, from the contractor, all bonds and insurance policies required in contract documents.		
Forward documents to the client for analysis and acceptance by experts.		
Advise the client to obtain legal confirmation.		
3. Advise the client to file copies of property insurance policies with the contractor, where applicable.		
4. Request the client to purchase special insurance (hazard, etc.) as part of property insurance policy, as appropriate.		
5. Remind the contractor to secure and pay for all required permits as specified in contract documents.		
6. Obtain and review the contractor's construction schedule.		
7. Obtain and review the contractor's schedule of required shop drawings and samples.		
8. Obtain and review the contractor's schedule of values.		
9. Furnish the contractor with required copies of contract documents.		
10. Assist the client, or direct the consultants to assist with applications for gas, water, electricity, telephone, and other services, as required.		

Part B — *Tasks during the contract administration phase*

1. Establish, with the contractor, requirements for testing and inspection of specific materials and work by inspection and testing companies.		
Arrange for distribution of reports through proper channels for action if necessary.		
2. Prepare colour and finish selections. (Note: this is sometimes done in Construction Documents phase.)		
Obtain the client's approval.		
Issue to the contractor.		
3. Review submitted shop drawings.		
Instruct the consultants to review as appropriate.		
4. Review submitted samples where applicable and comment accordingly.		
Instruct the consultants to review as appropriate.		
5. Maintain shop drawing and sample record (refer to Form 5.4, Log of Shop Drawings and Samples, in Chapter 2.4).		
6. Advise on interpretation of contract documents.		
Issue supplemental details and instructions as required (refer to Form 3.2, Supplemental Instructions, in Chapter 2.4).		
7. Attend site meetings.		
8. Make site visits to observe specific events as required.		
Submit — to the client, to the contractor, and to Authorities Having Jurisdiction — all field review reports, including those of professional engineering consultants (refer to Form 3.1, Field Review Report, in Chapter 2.4).		
Issue written instructions to the contractor when applicable.		
9. Advise on interpretation of contract documents and on contemplated changes.		
Process and coordinate changes to contract after consultation with the client.		
Review contractor's submissions for changes in contract sum and time in conjunction with professional engineering consultants.		
Advise the client on validity of claims for extras.		
Issue Change Orders as required.		
Obtain the client's signature/approval.		
Copy appropriate authorities as applicable.		

Part C — *Ongoing scheduled tasks during the contract administration phase*

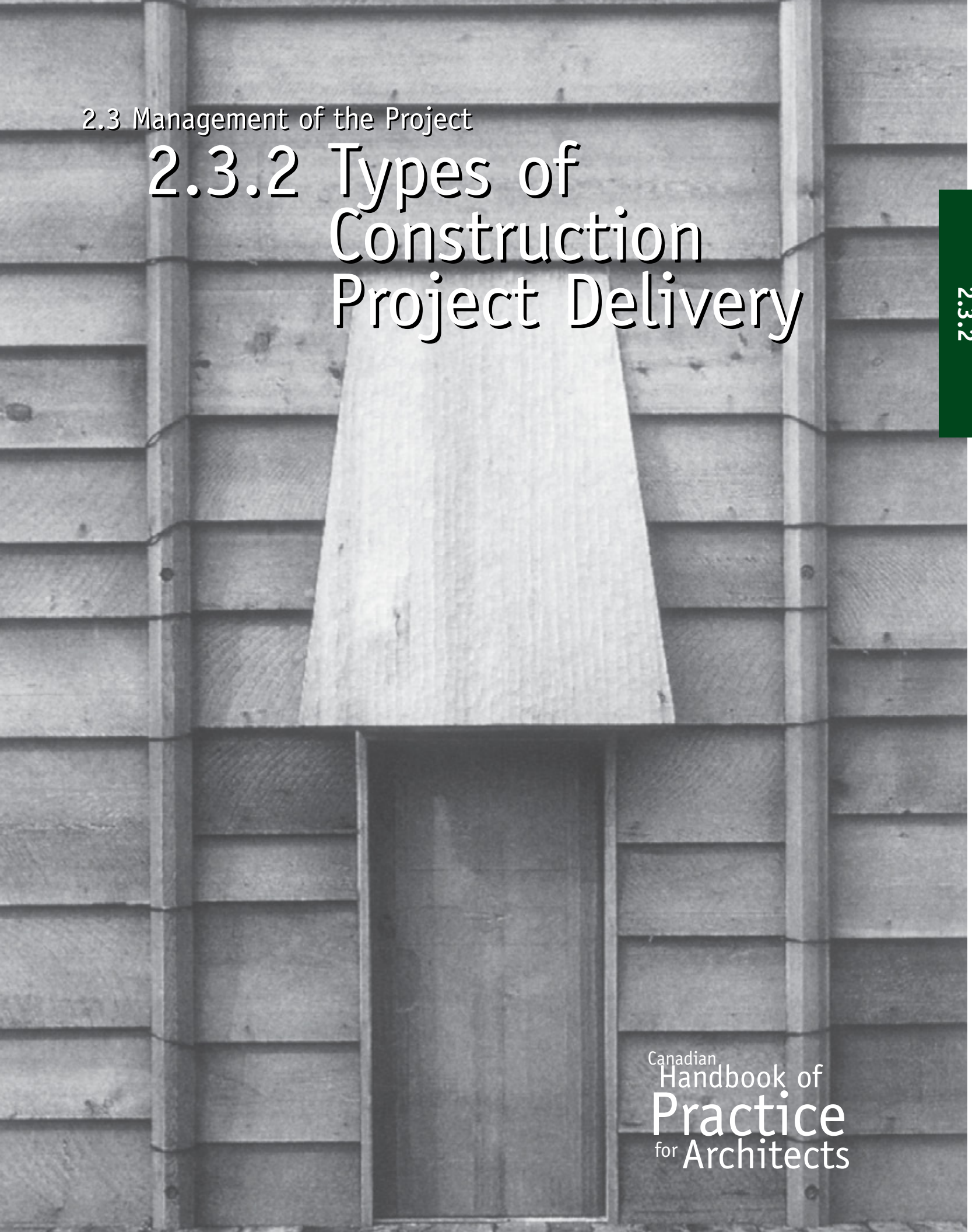
1. Make periodic visits to site to determine whether construction is in general conformity with contract documents.		
2. Coordinate general reviews and other services of professional engineers and direct findings through proper channels for action or review.		
3. Obtain and review the contractor's updated progress schedule and advise the client of potential revisions to date of substantial performance (if required).		
4. Evaluate work performed and materials supplied in relation to the contractor's progress application.		
Issue appropriate Certificate for Payment covering the contractor's request.		

Part D — *Project take-over tasks*

1. Review prescribed procedures, e.g., specifications and other documentation.		
2. Arrange for appropriate personnel to attend demonstration(s) of systems, including take-over of applicable operating systems and instructions.		
Obtain appropriate record.		
3. Receive, from the contractor, application for Certificate of Substantial Performance and list of items to be completed or corrected.		
4. Carry out site visit for substantial performance.		
5. Review findings in relation to contract and provincial lien legislation.		
Certify substantial performance or notify the contractor if substantial performance not certified, and provide reasons.		
6. Obtain and review required documents for release of holdback monies.		
Issue Certificate for Payment for release of holdback.		
7. Assist the client in obtaining occupancy permit if required or requested.		
8. Obtain from the contractor:		
• warranties		
• certificates of inspection		
• equipment manuals		
• workers compensation certificate		
• operating instructions		
• statutory declaration documents		
• keying schedules		
• maintenance stock		
• Record drawings		
• other specified items		
9. Receive, from the contractor, application for statement of completion.		
10. Carry out site visit for completion.		
11. Review findings in relation to contract and provincial lien legislation.		
Issue:		
• statement of completion or notify contractor if project not found to be complete		
• reasons		
12. Issue Certificate for Payment of holdback for work based on the contractor's application for statement of completion.		
13. Receive the contractor's written notice that all work has been totally completed.		
14. Perform final visit to site.		
Issue site visit report.		
15. Receive, from the contractor, final application for payment.		
16. Issue final Certificate for Payment.		
17. Prepare CAD record drawings if required.		
18. Submit final invoices to the client.		
19. Advise professional liability insurer of project completion date, as required.		
20. Review reported defects during one-year warranty period.		
Notify the contractor of items requiring correction.		
21. Carry out review of reported defects or deficiencies prior to expiry of one-year warranty period.		
Notify the contractor of items requiring correction.		

VII Post-construction Services

1. Assist the client in administering corrective action by the contractor where defects or deficiencies occur within extended warranty period.		
2. Prepare Project Data Sheets for marketing purposes (include photographs, client testimonials, etc.).		



2.3.2 Types of Construction Project Delivery

Canadian Handbook of Practice for Architects

2.3.2

Introduction

Types of Construction Project Delivery
- Stipulated Price Contract (Design-Bid-Build)
- Construction Management
- Design-Build
- Public Private Partnership
- Others

Contractors
- Pre-qualification of Contractors
- Multiple Contracts

Types of Construction Contracts
- Standard Forms of Contract
- Other Types of Contracts

Definitions

References

Appendix — Project Management
1. Scheduling the Project
   - Milestone Chart
   - Gantt Diagram
   - Program Evaluation and Review Technique (PERT)
   - Critical Path Method (CPM)
2. Preparing a Critical Path Method (CPM) Schedule

Chart: Standard Forms of Construction Contract and their Application

Types of Construction Project Delivery

Introduction

The design and construction industry is changing at a rapid pace. Options for project delivery have multiplied and more than one option is available for each project, depending on the client's needs and the project team's ability to deliver. *Project delivery* methods in the construction industry have evolved in response to:

- increased owner requirements;
- more urgent time frames;
- increased demands for quality and safety;
- the need to reduce adversarial relationships in construction;
- economic pressures.

Project delivery is a general term describing the comprehensive process used to successfully complete the design and construction of buildings and other facilities. The term is used to include all the procedures, actions, sequences of events, obligations, interrelations, contractual relations, and various forms of agreement.

There is no "best" delivery system; each is appropriate in particular circumstances.

Types of Construction Project Delivery

This section provides:

- a brief description of common delivery methods;
- a basis for comparing them;
- a general evaluation of their advantages and disadvantages.

Stipulated Price Contract (Design-Bid-Build)

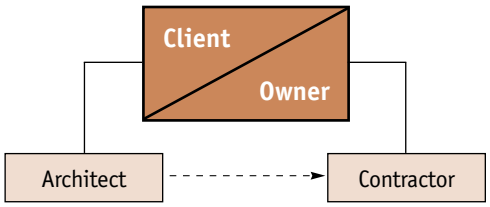
Most building projects follow this traditional method of project delivery (sometimes referred to as "Design-Bid-Build") in which:

- the owner engages an architect to prepare the design, drawings, and specifications;
- the owner hires a contractor by competitive bidding to build the facility under a construction contract (usually CCDC 2, *Stipulated Price Contract*);
- the architect administers the contract, and reviews and certifies the construction.

This *design-bid-build* form of project delivery is characterized by:

- its three distinct phases;
- its two independent contracts between: the architect and the client/owner; the contractor and the client/owner;
- the linear sequencing of the process.

Illustration 1: Design-Bid-Build



Key to the Diagram
——— contract between two parties
- - - - - monitor/review/administer

Advantages
- widespread use and familiarity;
- clear roles assigned to each party;
- generally a transparent process
- thorough resolution of the program requirements and design prior to construction;
- Direct professional relationship between the client / building users and the architect;
- has a known price before construction begins.

Disadvantages
- separation of design and construction restricts useful communication;
- clients sometimes perceive "extras" to be more prevalent and costly in this form of

The following table provides a brief Executive Summary of the some common Types of Construction Project Delivery:

Method of Construction Project Delivery	Standard Form of Contract	Description
Design-Bid-Build	RAIC Document Six: Canadian Standard Form of Contract for Architectural Services *followed by* CCDC 2 Stipulated Price Contract (CCDC 3 or CCDC 4 may also be used)	Owner engages the architect to provide design services and prepare construction documents which are issued for competitive bids. General contractors submit bids for the project and the construction contract is awarded to the lowest bidder. The architect administers the construction contract.
Construction Management	CCDC 5a - Construction Management Contract for Services CCDC 5b - Construction Management Contract for Services and Work	Owner engages the architect to provide design services and prepare construction documents. The Construction Manager works for the Owner as a consultant providing services that normally include design input on constructability, cost estimating, scheduling, bidding, coordination of contract negotiations and award, timing and purchase of critical materials, cost control and coordination of construction activities
Design-Build	CCDC 14 Design-Build Stipulated Price Contract CCDC 15 Design-Builder / Consultant Contract (subcontract)	A method of project delivery in which the Owner contracts directly with a single entity that is responsible for both design and construction services for a construction project
Public Private Partnership (P3)	No standard form of contract	A form of partnership between the public and private sectors where a combination of financing, design, construction, operation and maintenance of public projects relies on alternate sources of financing and revenue to cover all or part of the capital costs (including debt servicing, principal payment and return on equity), as well as operating and maintenance costs of for the project.
Single Purpose Entity for Integrated Project Delivery	Not yet available in Canada, as of January 2009 In the US, AIA Document C195	This new form of project delivery, championed by the AIA, creates a new single purpose entity or limited liability company which includes members such as the owner, architect, construction manager and other key project participants in the design and construction the project. The entity enters into contracts with non-members for design, trade contractors and suppliers for services, labour and materials. The entity enters into a separate agreement with the Owner to obtain project funding.

project delivery than others (although every form of project delivery carries a construction contingency);
- the contractor is unknown when the construction documents are prepared.
- contracts, particularly for public sector projects, are awarded to the low bidder who may not be well-qualified to do the work. Prequalification of contractors on public sector bids is not common.

Construction Management

Construction management is a broad term covering a variety of project delivery scenarios in which a construction manager (CM) is added to the building team at an early stage to oversee such elements as schedule, cost, construction method, or building technology. A construction manager may be:

- an architect;
- a contractor;
- an engineer or developer;
- an individual or team with specialized training in construction management.

Because this method adds a consultant and the associated fee, it is more commonly used on large, complex projects than those that are relatively small and simple. However, occasionally an architect acts as the construction manager on small projects such as house additions and renovations. Construction management is not a licensed activity in most provinces.

CMs can serve in different capacities with varying degrees of authority and responsibility (advisor, agent or constructor). Depending upon how the project is organized, a CM can:

- act as an **advisor** during a particular phase of the design, documentation or construction process;
- **manage** the construction of the project, with the owner contracting directly with each trade contractor. In this case, the CM may, or may not, be permitted to assume responsibility for construction activities typically outlined in General Conditions of the specifications (for example, temporary facilities, site layout, clean-up).

Savings in project costs are usually achieved only by the use of a delivery system that returns savings on sub-contractor bids directly to the owner with an "open book" accounting system and full transparency of all bids.

The fee paid to the construction manager is relative to the services to be performed. Refer to *CCDC 5a, Construction Management Contract for Services* and *CCDC 5b, Construction Management Contract for Services and Work* and their guides.

Typical responsibilities of a CM include:

- assisting in preliminary planning relative to the design requirements for the project;
- advising on schedules, budgets, and costs of various alternative methods, on material selection and availability, and on detailing during the design phase;
- advising on and arranging for all services and all trade contractors and suppliers to carry out the various phases of the work;
- planning, scheduling, coordinating, and supervising the activities of all trade contractors;
- providing technical and clerical services in the administration of the project.

Advantages
- direct contractual relationship with the owner;
- construction advice during the design process;
- the opportunity to call bids sequentially, thus saving time by permitting a start on construction before all documentation has been completed ("fast track");
- careful monitoring of costs and schedule (different checks and balances apply during design and construction because the architect, trade contractors, and CM are independent entities).

Disadvantages
- construction usually commences before the total costs are known;
- added costs and time in selection of an additional consultant;
- more complex relationships therefore traditional roles may be confused,
- the professional relationship between architect and owner and architect and contractor now includes a third party, sometimes complicating direct communication;

- potential for less control over final cost in an unstable construction market;
- Change Orders and delay claims are possible from prime or trade contractors who bid too low;
- there may be conflicts of interest if there is no independent cost consultant and the CM will be undertaking some of the construction work;
- the owner, as the "constructor," may not want to accept responsibility for construction safety;
- multiple construction contracts increase administrative costs for the Owner and the potential for coordination problems.

Design-Build

In Design-Build, the owner contracts with one firm to provide both design and construction. In fact, there are two variations on Design-Build: in some cases the Owner will initially engage an "advocate" architect (sometimes called a "bridging" consultant or Owner's Advisor) to prepare the Owner's Statement of Requirements and provide advice, and then engage a Design-Builder. In other instances, only a Design-Builder is hired.

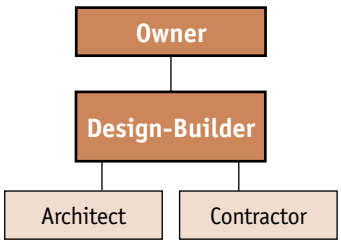
A Design-Build project usually has two phases:

- *Phase 1:* The Design-Builder, possibly in competition with other Design-Builders, provides architectural design services and, throughout the design process, monitors costs to ensure the building remains within the owner's budget. Based on the design developed in the first phase, the Design-Builder usually proposes a stipulated maximum price, which includes a fee for managing the construction.

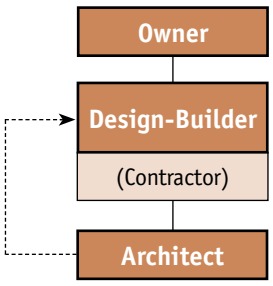
Illustration 2: A Comparison of Design-Bid-Build vs. Design-Build

Design-Bid-Build	Design-Build
Two contracts with the owner (more if engineers hired directly by the owner).	One contract with the owner (one point of primary responsibility).
Architect has contract with the owner.	Architect has contract with the Design-Builder (or is the Design-Builder).
Architect is usually engaged, and design and drawings complete, before the contractor is known.	Contractor is engaged before the design is complete.
Design and construction process is usually linear.	Design and construction process is more suitable for "fast track."
Familiar relationships: insurable, bondable, and acceptable under professional regulations.	Emerging relationships: terms of reference need to be checked for insurability, bondability, and acceptability under professional regulations.

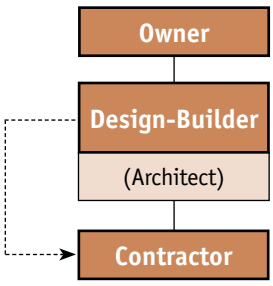
Design-Build (generic)



Design-Build (contractor-led)



Design-Build (architect-led)



Key to the Diagram

—— contract between two parties

- - - - - monitor/review/administer

- *Phase 2:* The parties enter into a stipulated price contract for the completion of the building. It is also possible to have a cost plus fee agreement in the Design-Build method of project delivery. The builder works to save costs during construction. Any savings accrue to the owner, who pays only the actual cost of construction, plus the Design-Builder's fee.

Refer to CCDC 14, *Design-Build Stipulated Price Contract*.

The following chart is a simplified comparison of Design-Bid-Build vs. Design-Build.

Advantages

- functional program (statement of owner's requirements) and owner's decisions are committed early;
- cost benefit analysis is addressed early in the design process;
- immediate feedback is received from the contractor on design options;
- streamlined process can increase efficiency;
- team approach is reinforced.

Disadvantages

- the responsibility for design approvals shifts from the owner to the Design-Builder;
- decisions by the Design-Builder are based more on initial cost rather than on design or long-term value;
- the cost is determined before the design is complete;
- additional fees when two architects are involved - an advocate architect engaged by the owner and a second architect engaged by the Design-Builder;
- architect's role as leader of the design team is reduced;
- high risk to the architect for preparing the proposal, which may or may not be successful;
- potential for tension between the "regulated" professional (architect) and the "unregulated" building contractor;
- potential for a lack of communication between the architect and the owner or building users;
- potential conflicts of interest in preparing Change Orders and certification because the architect's client and builder are one and the same.

Refer also to the *Design-Build Practice Manual* published by the Canadian Design-Build Institute.

Public Private Partnership

Public Private Partnerships or P3s (called "Alternate Financing and Procurement" or AFP in Ontario) is a relatively recent method of project delivery for public projects. It is generally used for infrastructure (civil engineering works) and larger scale public buildings, however, some governments are "bundling" several small buildings of the same type into one contract. P3s occur when the private sector works with governments or other public agencies to bring private sector capital and/or expertise to provide and deliver public services. The scale of a P3 project usually is significant and may include financing, design, construction, and very often facilities management and operations.

Critics of the process argue that the cost of P3 projects exceeds the cost of the same projects delivered under more traditional forms of project delivery because of the costs for financing and the hidden costs of "risk transfer" to the private sector. Governments and public agencies argue that these projects would not have been possible under traditional government processes using public funds. Furthermore, they argue that these projects can be delivered more quickly through P3s in response to the growing "infrastructure deficit".

This form of project delivery is used as a procurement method for larger infrastructure projects in government sectors in parts of Europe and Australia. For example, PFI or Private Finance Initiative is the standard method of project delivery in England.

Advantages

- uses the efficiencies and expertise of the private sector for public sector projects;
- allows projects to be financed in ways which may not be possible through public methods (such debentures, taxation, etc.) and may not be accounted for as a capital expenditure;
- life cycle costs can be reduced because with private sector operating the facility these costs become critical;

- single point responsibility;
- architects may develop long term relationships with ongoing consortia (project entities);
- reduced time and construction schedule to deliver projects compared with traditional public sector methods;
- design often becomes the "differentiating" quality in a proposal.

Disadvantages

- transfers or allocates certain financial risks to the private sector;
- "best value" is not always achieved as initial capital costs sometimes become overly important;
- potential for a lack of communication between the architect and the owner or building users;
- building users have less control over the process and its outcomes;
- sometimes more difficult to obtain professional liability insurance;
- difficult for small architectural practices to compete in this market.

Others

Other management and project delivery include:

- project management
- just-in-time;
- turnkey development;
- lease-back;
- cost plus

Project Management

The main difference between PROJECT MANAGEMENT and CONSTRUCTION MANAGEMENT is that the Project Manager has a contract with a client and in turn employs the architectural and engineering consultants to form his group, whereas under the Construction Management aspect the owner engages the architectural and engineering consultants, and at the same time or shortly afterwards, engages the services of a Construction Manager.
(Canadian Construction Association, *A Guide to Construction Management Contracts*)

In this delivery method, the Project Manager (PM) is usually hired by an owner during the pre-design phase to **manage the entire project** and engage all the disciplines required, including the architect and the consulting engineers. The typical project management project may have the same three phases (Design-Bid-Build) as traditional project delivery, or it may use sequential tendering to achieve earlier completion.

Advantages

- a well-informed owner is better able to make decisions on cost-versus-quality issues;
- the quality of the design may improve when the architect can draw on the PM's experience.

Disadvantages

- this arrangement is NOT permitted by the regulations of *most* provincial associations of architects. For example, in Ontario, unless the Project Manager is a "Design-Builder," this is contrary to OAA Regulation 42(55) as well as the Code of Ethics of OAQ and the *Architects Act* of British Columbia;
- unless the architect can maintain a direct link with the owner, the owner's ability to control construction quality is reduced because efficiencies or cost reductions implemented by the PM that affect quality may not be discussed directly with the owner.

Just-in-Time

This approach combines aspects of fast tracking, partnering, systems architecture, and strong incentives for repeat work. Large projects are broken into small work packages. Small teams of architects and contractors program, plan, demolish, and construct these areas on an hourly basis driven primarily by schedule, where time is the most critical factor.

Turnkey Development

Turnkey is generally described as a project delivery method that includes various real estate functions as well as design and construction. These functions may include site acquisition, entitlements, construction and/or long-term financing or other functions. This method may be carried out under Design-Build or developer proposal methods.

Unit Rates

Use of this method is limited primarily to heavy civil engineering work — such as roads, and site

preparation — where the contractor is paid for measured quantities at quoted unit rates. The method could be appropriate for the cost of repetitive units or identical buildings. The architect should ensure that unit rates are applied only to the design and documentation phases. The bidding and contract negotiations phase, as well as the contract administration phase, require full services.

Lease-back

Under this method, the project is financed, constructed, and owned by the builder, and the building is "leased-back" to the owner.

Cost Plus

In the cost plus method, the contractor is compensated for the actual costs of the work, plus a fee. The fee is based on:

- an agreed-upon fixed sum; or
- a percentage of the cost of the work.

Often called "time and materials," this method is appropriate for small, complicated projects in which time is a factor or total costs are initially difficult to determine. A variation of cost plus is "cost plus to a maximum upset price" or guaranteed upset price. The cost plus method normally uses CCDC 3, *Cost Plus Contract*, but is now frequently replaced by the construction management delivery method, which includes many of the advantages and few of the disadvantages.

Advantages

- costs are based on actual quantities and mark-ups with no "unknown factor";
- suitable when time frame is more important than construction costs (saves time because a formal tender call is not required);
- flexible in response to unknowns at the start of construction;
- suitable where extraordinary quality is required;
- construction may begin before design is complete.

Disadvantages

- no incentive to avoid cost overruns;
- often not permitted on publicly funded projects;
- total cost is unknown until project completion.

Contractors

Each type of project delivery has variations, which can be organized to suit the requirements of the project and the involvement of the contractor. Selecting the contractor best suited to the particular type of project delivery is an important decision.

Pre-qualification of Contractors

The purpose of pre-qualification is to ensure that the selected contractor is capable of delivering quality and value specific to the project requirements. The client, through pre-determined criteria, eliminates candidates who cannot demonstrate that they have the necessary financial capacity, technical expertise, managerial ability, and relevant experience for the project at hand. Pre-qualification is rarely used for public projects, where the opportunity to be considered as the contractor must be open to all. Refer also to Chapter 2.3.9, *Construction Procurement*.

CCDC 11, *Contractor's Qualification Statement*, is the standard document used for pre-qualification.

Multiple Contracts

There may be a variety of reasons to have multiple contracts for one project, such as:

- two or more general contractors are working on the same site;
- there is a need for sequential tendering for different parts of the project;
- the owner may be undertaking some of the work with his/her own forces, concurrent with a general contractor.

Some provinces have legislation which defines the owner as the constructor when there are multiple contracts. This has the effect of making the owner responsible for safety at the construction site.

Sequential tendering is sometimes required for different parts or phases of a project; in this instance, separate bid packages are issued for these parts, usually in the same sequence as required for construction (such as site work, foundations, structural shell, etc.).

Types of Construction Contracts

Standard Forms of Contract

The construction industry has recognized the advantages of jointly preparing standard forms of contract. Many of the documents are developed and endorsed by the Canadian Construction Documents Committee (CCDC). Refer to Chapter 1.2.1, *The Construction Industry*, for the composition and role of this committee.
The CCDC publishes Standard Contract Forms, including:

- CCDC 2, *Stipulated Price Contract*;
- CCDC 3, *Cost Plus Contract*;
- CCDC 4, *Unit Price Contract*.
- CCDC 14 *Design-Build Stipulated Price Contract*.

The forms, which are available in both English and French, are sub-divided into three parts:

- Agreement between Owner and Contractor;
- Definitions;
- General Conditions.

The use of CCDC Standard Contract Forms is recommended. Because each document is reviewed periodically by the CCDC and revised as required, the architect should obtain and complete the latest edition when preparing construction contracts for the client's use and execution.

Refer to "List: Canadian Construction Documents" at the end of Chapter 1.2.1, *The Construction Industry*.

Stipulated Price Contract
[CCDC 2, *Stipulated Price Contract* and CCDC 20, *A Guide to the Use of CCDC 2*]
This is the most common type of fixed-price contract. The stipulated price is established through bidding — either open bidding or invitation of bids from pre-qualified bidders. The successful contractor is paid a fixed price for the completed construction. The fixed price or time for construction can only be adjusted by Change Orders.

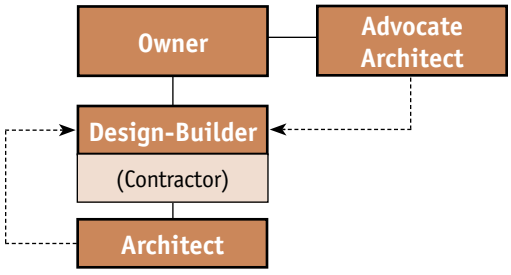
The contractor is required to perform work called for in the contract, regardless of what it actually costs. Thus, the contractor must take great care when pricing such work, taking into account potential cost increases caused by inflation, material shortages, or difficulties in meeting performance requirements.

A stipulated price contract can produce maximum profit for the contractor, who also assumes maximum risk, including the risk of unexpected additional costs such as those that might result from inflation or material shortages. This type of contract should be used when the construction costs are reasonably predictable and when full documentation is available.

Design-Build Stipulated Price Contract
[CCDC 14, *Design-Build Stipulated Price Contract*]
In the Design-Build stipulated price contract, the owner deals with one single business entity, which arranges to provide both design services and construction of the project under one contract package. Prices established before design is completed may cause disagreement over the scope of the work or the details of construction intended for inclusion in the stipulated price.

The prime contract is between the owner and the Design-Builder, where the Design-Builder could be a contractor, an architect, a broker, or a joint venture between a contractor and an architect. The architect should contact the respective provincial association to verify regulations concerning the architect's role as a Design-Builder, and for joint venture restrictions. The Design-Builder's consultants are the only consultants recognized in the contract, although the owner may also appoint an advocate architect or other consultants to represent the owner's interests.

Illustration 3: Bridging



The second contract [CCDC 15, *Design-Builder / Consultant Contract*] is between the project's Design-Builder and the architect.

Cost Plus Contract (percentage or fixed fee)
[CCDC 3, *Cost Plus Contract* and CCDC 43, *A Guide to the Use of CCDC 3*]
In a cost plus contract, the contractor is compensated for the actual costs of the work, plus a fee based upon either an agreed-upon fixed sum or a percentage of the costs. Often called *time and materials*, this method is appropriate for small, complex projects in which total costs are initially difficult to determine.

A cost plus contract is one of the simplest types of cost-reimbursement contracts. It has the following features:

- the owner reimburses the contractor for the allowable costs incurred in the course of construction;
- costs are paid regardless of the progress of the work and no matter how far the task is from completion;
- work may cease when the construction costs equal the funds provided for under the contract.

Guaranteed Maximum Price Contract
[CCDC 3, *Cost Plus Contract* with Guaranteed Maximum Price Option]
In this type of contract, the contractor is compensated for the actual costs, plus a fee with an agreed-upon maximum price. This is sometimes called an *upset price* contract. The contractor bears all costs beyond the pre-determined maximum. If the actual costs are below the maximum, the contractor may share the savings with the owner, depending on the terms of the contract. The guaranteed maximum price can be adjusted only by Change Order.

Unit Price Contract
[CCDC 4, *Unit Price Contract*]
In a unit price contract, the contractor is paid a pre-determined price for each unit or quantity of work or material used in the project's construction. The unit price can be derived through bidding or negotiation. The actual quantities involved are generally verified by independent inspection, for example, by a clerk of the works or a quantity surveyor.

Unit prices form the basis for payment of the contract price. Quantities in the schedule of prices are estimated. The contract price is:

- the final sum of the product of each unit price stated in the schedule of prices;
  multiplied by
- the actual quantity of each item that is incorporated in or made necessary by the work;
  plus
- lump sums and allowances, if any, stated in the schedule of prices.

Currently, CCDC 4, *Unit Price Contract*, has limited use in Canada for building construction. It is used primarily for civil engineering work.

Other Types of Contracts

Other types of construction contracts include:

- government or "in-house" contracts;
- contracts with economic price adjustment;
- incentive-based contracts;
- standing offer contracts;
- purchase order contracts;
- oral contracts.

Government or "In-house" Contracts
Various federal, provincial, and municipal governments have their own forms of contract which include different General Conditions. These documents are printed forms, and normally are not amended.

In some instances, a public body or large corporation will choose to prepare its own forms of contract for construction. The architect required to administer these documents should review these contracts prior to providing a proposal for contract administration services. Refer to Chapter 2.1.9, *Risk Management and Professional Liability*, for the pitfalls in the use of non-standard contracts.

Contracts with Economic Price Adjustment
Some fixed-price contracts contain economic price adjustment clauses that protect the contractor and the client against wide fluctuations in labour or material costs when market conditions are unstable. These clauses may provide for adjustment of the contract price for increases or decreases from an agreed-upon level measured against the following:

- published or established prices of specific items;
- specified costs of labour and material actually experienced during performance;

- specified labour or material cost standards or indices, such as the consumer price indexes.

Incentive-based Contracts
(also known as incentive contracts, cost-plus-incentive-fee contracts, and cost-plus-award-fee contracts)

The contractor and the owner's contracting officer agree on:

- target cost;
- target profit;
- target fee;
- incentive formula for determining the final fee.

The formula provides for an adjustment in the fee, based on any difference between the target cost and the total allowable cost of performing the contract. The award amount paid varies according to the client's evaluation of the contractor's performance in such areas as:

- quality;
- completion time;
- ingenuity;
- cost-effective management.

Standing Offer Contracts
Government or institutional clients may retain one or more consulting firms, or construction companies pre-qualified by proposal call, to provide professional or construction services on an *as and when requested* basis (sometimes referred to as being "on retainer" or "on call"). Occasions arise when consulting or construction services are required to augment existing resources within a professional and technical services branch of government. Such a situation can encompass:

- peak workload relief;
- project review to ensure a higher degree of performance;
- situations where in-house expertise is not available.

Purchase Order Contract
Authorized officials (public or private) may purchase design and construction services not exceeding a stated amount using purchase orders. The use of purchase orders is usually restricted to:

- small transactions;
- one delivery and one payment;
- off-the-shelf items;
- small repairs.

Oral Contracts
Oral contracts should *never* be used. All agreements should be in writing.

Written client-architect agreements are a requirement of the Architectural Institute of British Columbia.

Definitions

Construction Manager: An individual employed to oversee and direct the construction elements of a project, usually the whole of the construction elements, and the parties who are to perform them; a company which contracts with an owner to perform such services for a fee.

Design-Build: Methods of project delivery in which one business entity or alliance (Design-Builder) forges a single contract with the owner, and undertakes to provide both the professional design services (architectural/engineering) and the construction.

Project Manager: The leader of the team of all necessary disciplines (design, construction, supply, etc.). The project manager provides all major essentials for the project. (The term "project manager" may be confused with construction manager; the meaning has become blurred and is currently often used merely for the individual within the conventional hierarchy.)

References

Associated General Contractors (AGC) of America. *Project Delivery Systems For Building Construction*. Alexandria, VA: AGC, 1997.

The American Institute of Architects (AIA). *Handbook on Project Delivery*. Sacramento, CA: The AIA California Council, 1996.

Canadian Construction Association (CCA). Ottawa, Ont.

- CCA 5, *Canadian Standard Construction Management Contract Form and A Guide to Construction Management Contracts*.
- CCA 17, *Stipulated Price Contract for Trade Contractors on Construction Management Contracts*.
- *A Guide to Construction Management Contracts*.
- *Performance Standards for Project Management and Scale of Fees for Project Management Services*.

Canadian Construction Association, Construction Specifications Canada, and the Royal Architectural Institute of Canada (endorsed by). Document 14, *Design-Build Stipulated Price Contract*. Ottawa, Ont.

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.

- CCDC 2, *Stipulated Price Contract*.
- CCDC 3, *Cost Plus Contract*.
- CCDC 4, *Unit Price Contract*.
- CCDC 11, *Contractor's Qualification Statement*.
- CCDC 14 *Design-Build Stipulated Price Contract*.
- CCDC 20, *A Guide to the Use of CCDC 2*.
- CCDC 43, *A Guide to the Use of CCDC 3*.

Canadian Design-Build Institute (CDBI). Ottawa, Ont.

- 100 Series: Introduction and General
- 200 Series: Procurement and Award
- Document 205: Methodology Assessment Matrix
- Document 210: Request for Proposal Guide
- 300 Series: Responding to RFQ's & RFP's
- Document 310: Conceptual Estimating
- 400 Series: A Guide to Project Delivery
- 500 Series: Model Forms

The Canadian Council for Public-Private Partnerships, *www.pppcouncil.ca*

Fisk, Edward R. *Construction Project Administration*. 5th Edition. Upper Saddle River, NY: Prentice Hall Press, 1997.

Gould, Frederick E. *Managing the Construction Process: Estimating, Scheduling, and Project Control*. New York, NY: Prentice Hall Press, 1997.

Kerzner, Harold. *Project Management: A Systems Approach to Planning, Scheduling, and Controlling, 6th Edition*. New York, NY: Van Nostrand Reinhold, 1997.

Lewis, James P. *The Project Manager's Desk Reference: A Comprehensive Guide to Project Planning, Scheduling, Evaluation, Control Systems*. Chicago, IL: Probus Pub. Co., 1993.

Litwin, Paul et al. *Access '97 Developer's Handbook — 3rd Edition*. Alameda, CA: Sybex, 1997.

Pierce, David R., Jr. *Project Scheduling and Management for Construction*. Second Edition. Kingston, MA: R.S. Means Co., Inc., 1998.

Appendix — Project Management

1. Scheduling the Project

Project schedules are planning tools that help project managers and teams organize various defined tasks in order to meet deadlines or dates which may be set out in an agreed-upon schedule or in the contract. In addition, schedules help to monitor tasks until the project is complete. Although a variety of scheduling techniques are available for many types of projects, the project manager must select a method which can be adapted to the scale and complexity of the work.

Milestone Chart

This simple method of scheduling involves setting target dates for each project activity. The name of the person responsible for each activity may also be noted. This method is used for:

- bidding;
- simple projects with a linear implementation;
- summaries of more complex scheduling arrangements.

This chart has limited potential because it can only indicate the end date — not the start date — of activities. Moreover, it does not show relationships between activities.

Diagram A: Milestones in the Bid Process

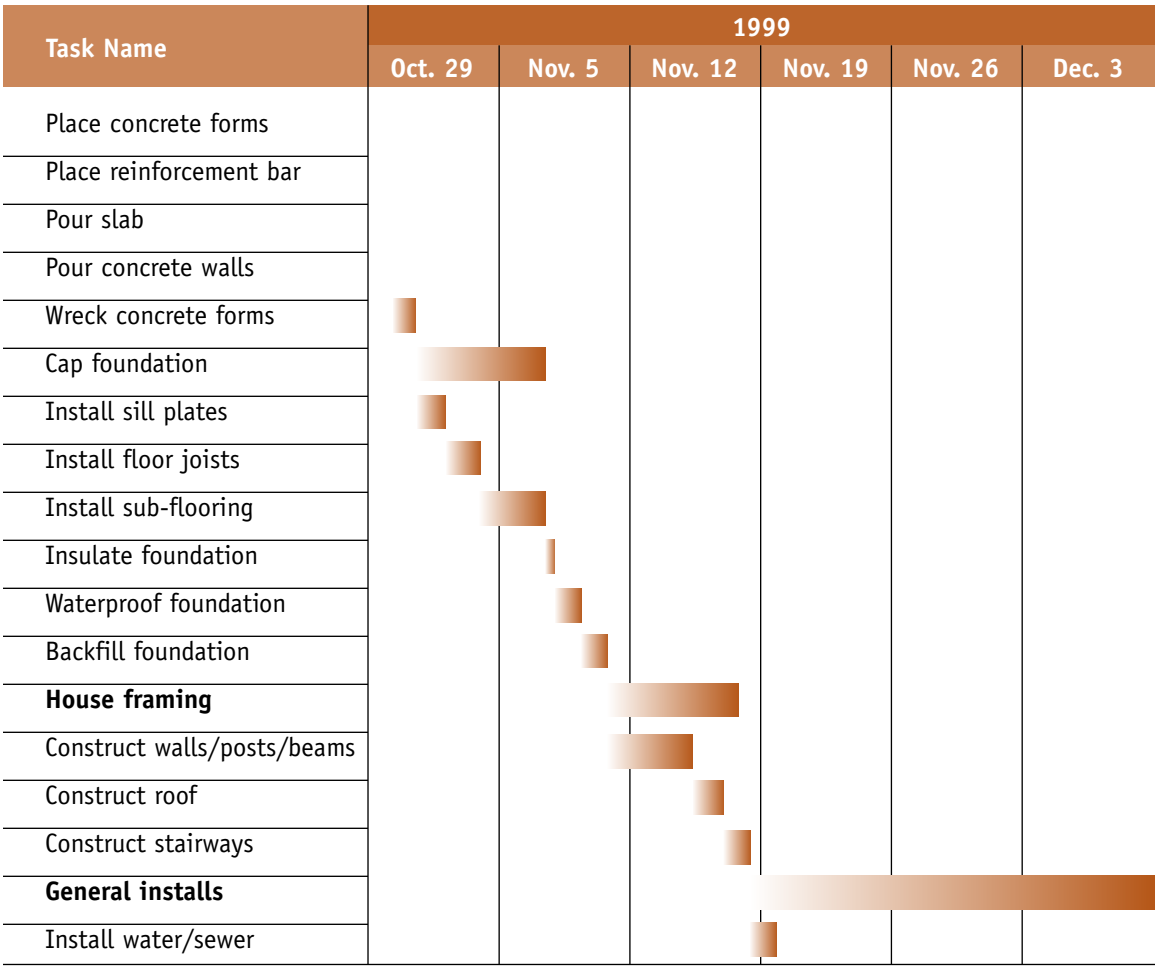
Task	Milestone Date
Issue text to newspapers	February 1, 2009
Distribute documents to bid depositories	February 4, 2009
Publish advertisements for bidders	February 5, 6, and 8, 2009
Issue final addenda	March 4, 2009
Bid closing	**March 11, 2009**
Analyze bids	March 12, 2009
Report to building committee	March 15, 2009
Notice of award of contract	March 17, 2009
Prepare and distribute CCDC 2 and contract documents	March 26, 2009
Start-up meeting	**April 19, 2009**

Gantt Diagram

Unlike a milestone chart, a Gantt diagram (a type of bar chart) lists all the required activities together with a horizontal line for each activity to indicate the beginning and end of each task in accordance with a time period shown at the top of the chart.

The bar chart is very common because it is easy to use, visually clear, and satisfies the requirements for most projects. On the other hand, it does not provide any information on the relative importance of tasks or their interrelationships.

Diagram B: Partial Gantt Chart or Bar Chart



Program Evaluation and Review Technique (PERT)

The Program Evaluation and Review Technique (PERT) is another method for monitoring the progress and periodically adjusting the schedule. PERT involves:

- defining the various tasks and milestones;
- linking these tasks in sequence;
- assigning a time estimate for the completion of each task.

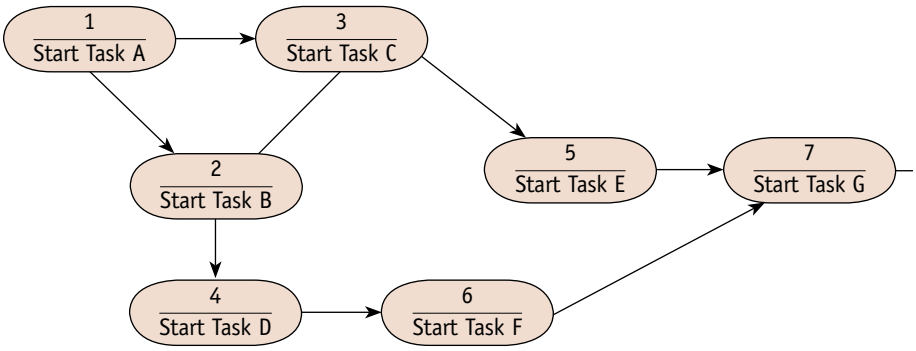
PERT is usually a graphical representation of the *dependency* network for an entire project. Dependencies are timing relationships between tasks which determine the *sequence of activities* or work flow in a project. Tasks are usually represented as boxes, and dependencies are represented as lines connecting the boxes.

PERT has one basic weakness: the fundamental assumptions of the length of time for completing each task are merely estimates and are not precise. Occasionally, formulae are used to increase the probable accuracy of the time estimate. For example, a better estimate of mean time can be achieved using the following formula:

$$T = \frac{a + 4m + b}{6}$$

T = mean time
a = most optimistic time, i.e., the shortest time for completion (best case scenario)
b = most pessimistic time, i.e., the longest time for completion (worst case scenario)
m = most likely time, i.e., the time that the work would most likely be completed based on its execution several times under randomly varying conditions

Diagram C: The PERT Network



T_e = earliest estimated completion time
T_1 = latest estimated completion time
S = slack time

Task A **Cure concrete**
T_e = 0 days
T_1 = 0 days
S = 0 days

Task B **Construct concrete block foundation wall**
T_e = 2 days
T_1 = 2 days
S = 0 days

Task C **Strip formwork**
T_e = 1 day
T_1 = 1 day
S = 0 days

Task D **Install anchors and sill plates**
T_e = 9 days
T_1 = 9 days
S = 0 days

Task E **Install filter fabric, gravel, and drainage tile**
T_e = 2 days
T_1 = 11 days
S = 9 days

Task F **Frame ground floor**
T_e = 11 days
T_1 = 11 days
S = 0 days

Task G **Backfill**
T_e = 13 days
T_1 = 13 days
S = 0 days

Critical Path Method (CPM)
This scheduling method uses arrows or lines to graphically demonstrate the relationships between:

- which activity must be undertaken first;
- which activity cannot be started until another has been completed;
- which activities can be carried out concurrently.

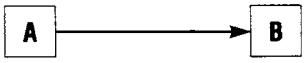
The chart helps to determine *the critical path* and identifies the stages which, if they are delayed, will slow down the entire project. It also identifies which activities can be delayed and for how long without having an impact on the duration of the project. Such delay capacity is called "float."

This type of project scheduling is frequently used for construction projects because many activities are underway at once, each dependent on the other.

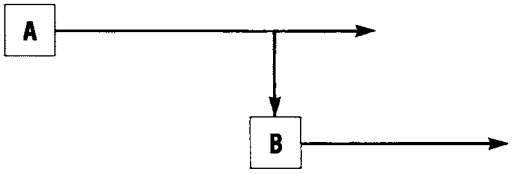
2. Preparing a Critical Path Method (CPM) Schedule

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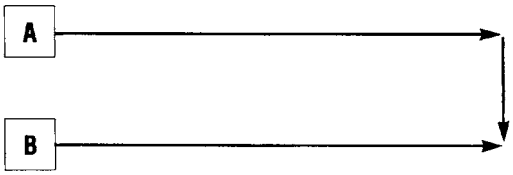
Step 1. Identify Task Interrelationships. The first step in preparing a CPM schedule is to identify systematically all task interrelationships. One way of doing this is to use a task interface diagram, also known as a precedence diagram. This diagram describes each of the three distinctive types of interrelationships graphically as follows:



Task A must be completed before task B can begin.



Task A must be partially completed before task B can begin.



Task A must be completed before task B can be completed.

An example of the first case would be:

Task A = determine heat loads
Task B = select air conditioning unit

Obviously the air conditioning unit cannot be selected until the heat loads are known.

An example of the second case would be:

Task A = prepare structural calculations
Task B = prepare structural drawings
Although structural calculations are necessary for the structural drawings, it is not necessary that the

calculations for *all* the structures be completed before the drawings of *some* of the structures can begin. Thus, task B cannot be started until a certain amount of progress has been made on task A.

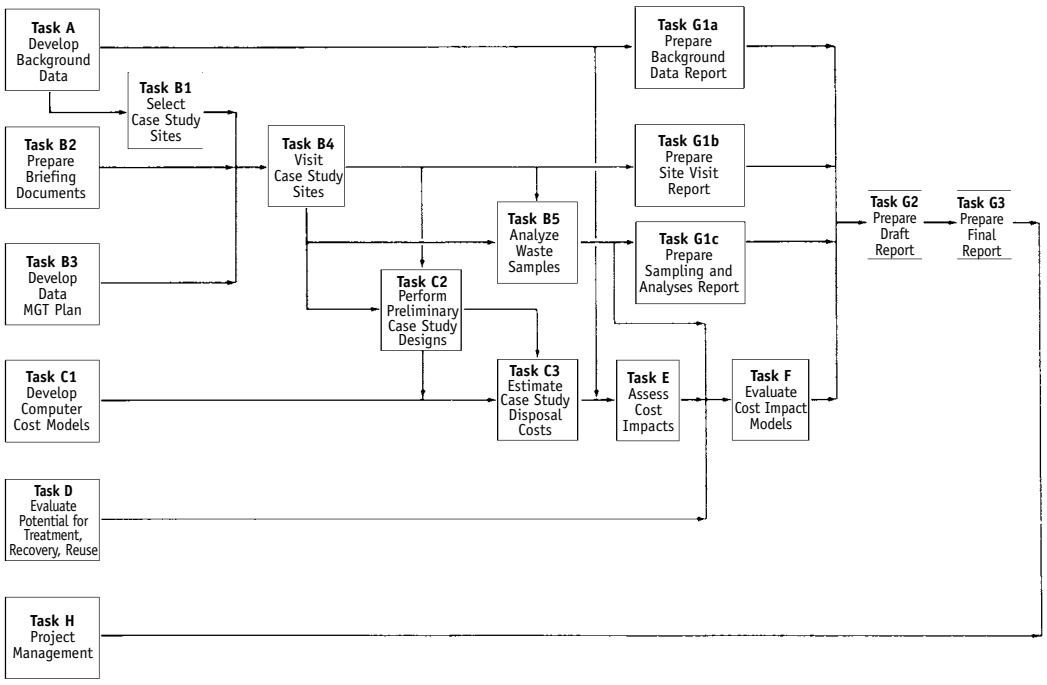
An example of the third case would be:

Task A = prepare piping drawings
Task B = prepare piping specifications

The specifications for common elements (including pipe supports, installation, and testing) can begin as soon as the project is reasonably well defined. However, the specifications cannot be completed until all the drawings are completed, so that all piping materials, valve types and so forth can be selected, identified, and tabulated.

Illustration A-1 shows how these interrelationships can be represented for a complete task outline. Study this diagram to see which of the three types of interrelationships exist between each pair of tasks. Note also that in this example, there is more than one type of interrelationship between two tasks. For example, interrelationship types 2 and 3 exist between tasks C2 and C3. In other words, task C3 (cost estimates) cannot begin until task C2 (preliminary design) is partially completed, and task C3 cannot be completed until task C2 has been completed. This double interface is quite common.

Illustration A-1: Task Interface Diagram



Step 2. Establish Optimum Task Durations. The next step is to establish the optimum duration for each activity on the task outline. This is the length of time (in calendar days) required for the activity to be completed in the most efficient manner possible assuming that all prerequisite tasks have been completed. A typical tabulation of task durations is presented in Illustration A-2 (using the same sample project as in the preceding illustration).

Note that task H, project management, is scheduled to extend 60 days beyond completion of all other tasks. This is typical of most projects performed by design firms. Even if all contractual responsibilities are completed by the contract due date, activities tend to continue beyond that date, such as printing of additional copies of drawings, answering questions from contractors or equipment vendors, organizing project files, or appearing at City Council meetings. Even if all contractual obligations have been met, these residual activities are part of the project management task and should be scheduled as such.

Step 3. Prepare Project Schedule. Having completed the basic task interface diagram and established optimum task durations, you may use these results to prepare a project schedule. Do this either in bar chart format or CPM format, in which the schedule is drawn as a network. The network schedule is best explained by using the same examples of simple two-task projects.

Let us say that the first sample project contains the following tasks and durations:

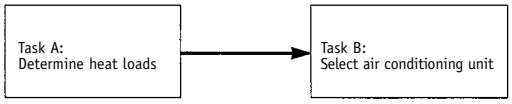
Task A = determine heat loads (five days' duration)
Task B = select air conditioning unit (four days' duration; cannot start until task A is completed)

Illustration A-2: Task Duration

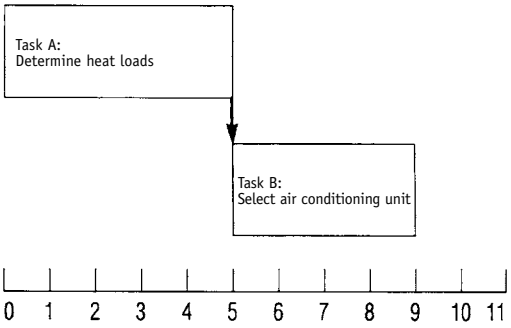
Activity Description	Calendar Days
A. Develop background data	180
B1. Select case study sites	30
B2. Prepare briefing documents	30
B3. Develop data management plan	90
B4. Visit case study sites	180
B5. Analyze waste samples	105
C1. Develop computer cost models	90
C2. Perform preliminary case study site designs	135
C3. Estimate case study disposal costs	30
D. Evaluate treatment, recovery, reuse	90
E. Assess cost impacts	60
F. Evaluate cost impact models	30
G1a. Prepare background data report	60
G1b. Prepare site visit report	60
G1c. Prepare sampling and analysis report	60
G2. Prepare draft report	60
G3. Prepare final report	60
H. Project management	*

* Task H should be completed 60 days after completion of all other activities.

The task interface diagram for this project will be:



This interface diagram can be converted to the network schedule shown below based on the defined task durations:

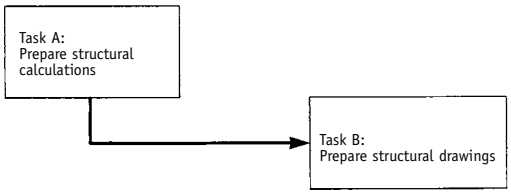


The vertical arrow in the network schedule serves the same purpose as the horizontal arrow in the interface diagram: to show that task B cannot begin until task A is completed. The arrow for the network schedule must be vertical to show that no time should elapse between completion of task A and start of task B. These vertical arrows are known as "dummy activities."

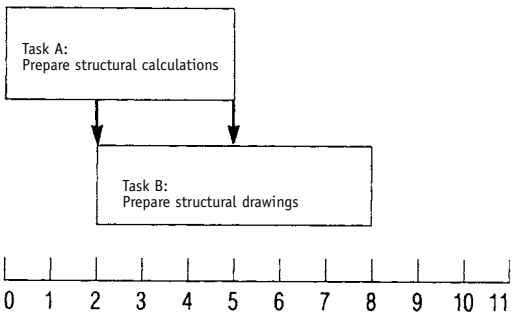
The second example contains the following tasks and durations:

Task A = prepare structural calculations (five days' duration)
Task B = prepare structural drawings (six days' duration; can begin after two days' work on task A)

The task interface diagram:



This diagram can be developed into the following network schedule:

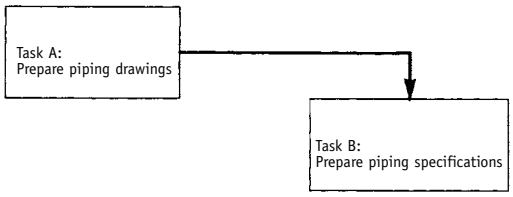


Note that the above schedule presumes that sufficient progress can be made by working on task A for two days in order to permit task B to be started. Again, the vertical arrow in the network schedule identifies the interrelationship between tasks A and B.

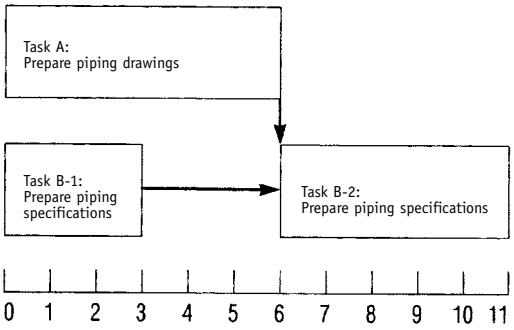
The third example defines the tasks and their durations as follows:

Task A = prepare piping drawings (six days' duration)
Task B = prepare piping specifications (eight days' duration; can start concurrently with task A, but three days' work remains after task A is completed)

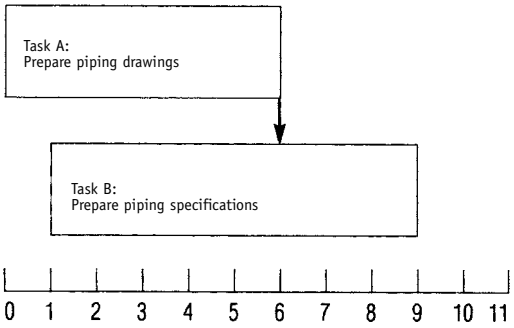
The task interface diagram:



From this interrelationship and durations of tasks, the following network diagram may be drawn:



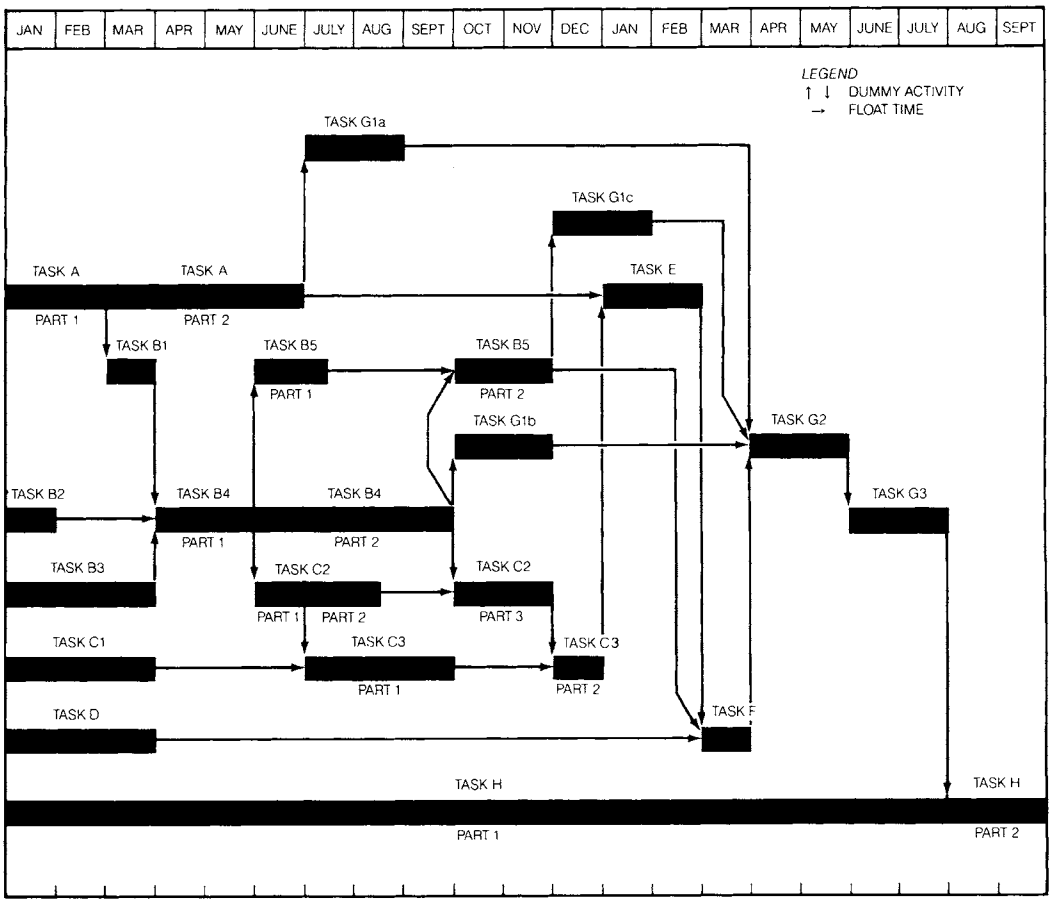
Note that task B can proceed up to a certain point, at which time you will need input from task A. If you had found that only three days of productive work could be done on task B prior to completion of task A, the schedule for the project above would have been:



Although the optimum duration of task B had been established as eight days, eleven days will actually be required to complete this activity. The additional three days are spent waiting for task A to be completed before the second part of task B can be started. This delay is shown by the horizontal arrow connecting parts one and two of task B. These horizontal arrows are referred to as float time.

The methods shown in the above examples may be used to develop a network schedule such as the one shown in Illustration A-3.

Illustration A-3: Time-Based Task Interface Diagram



Step 4. Determine Critical Paths. The last step in the CPM procedure is to determine which tasks are critical — that is, which tasks will affect the project completion date if any delay occurs. The critical tasks for each of the four two-task project examples are shown in Illustration A-4. For projects with fewer than 100 tasks, the critical tasks may be determined by graphic inspection, with results such as those in Illustration A-5.

Illustration A-4: Critical Tasks for Sample Projects

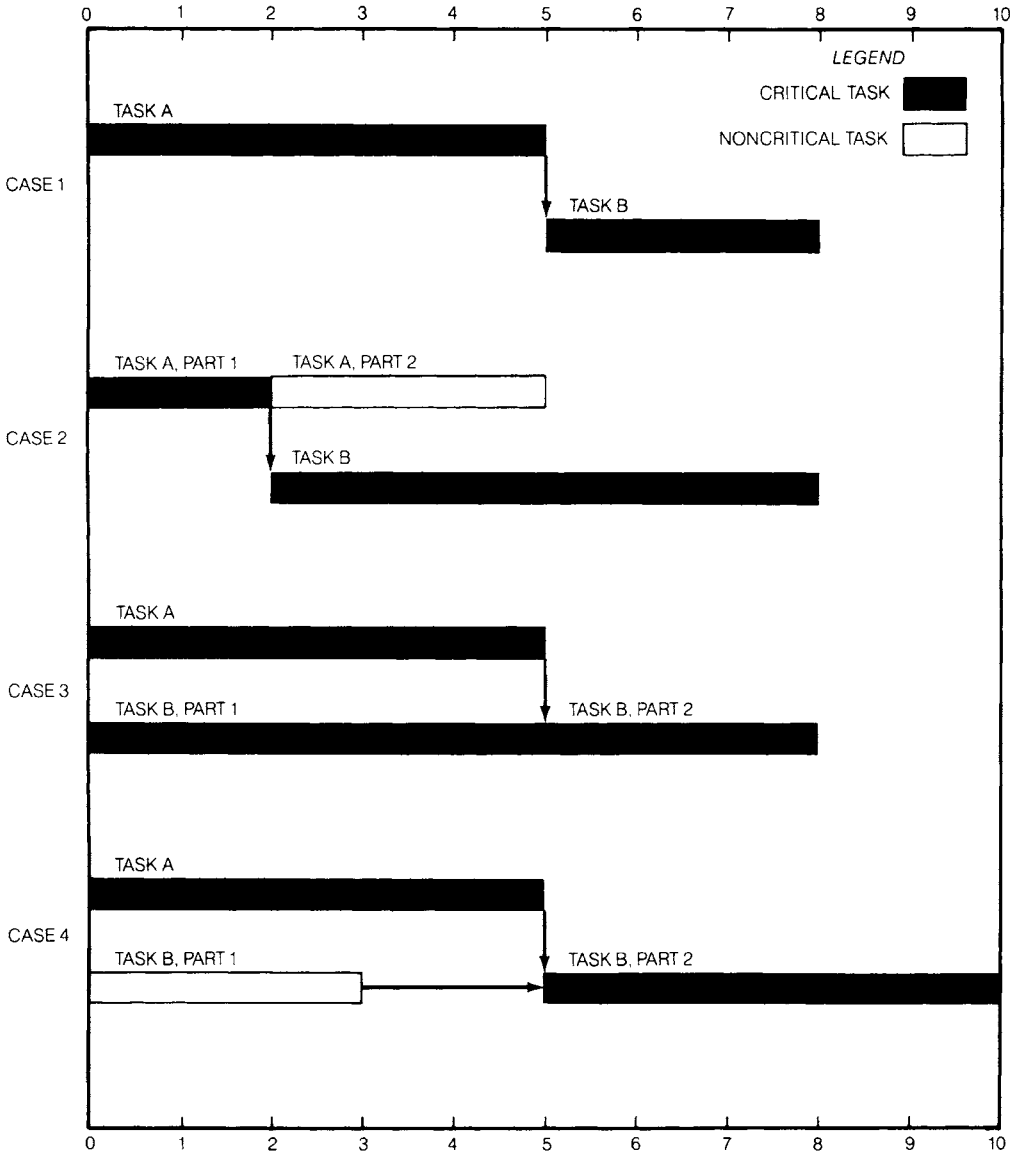
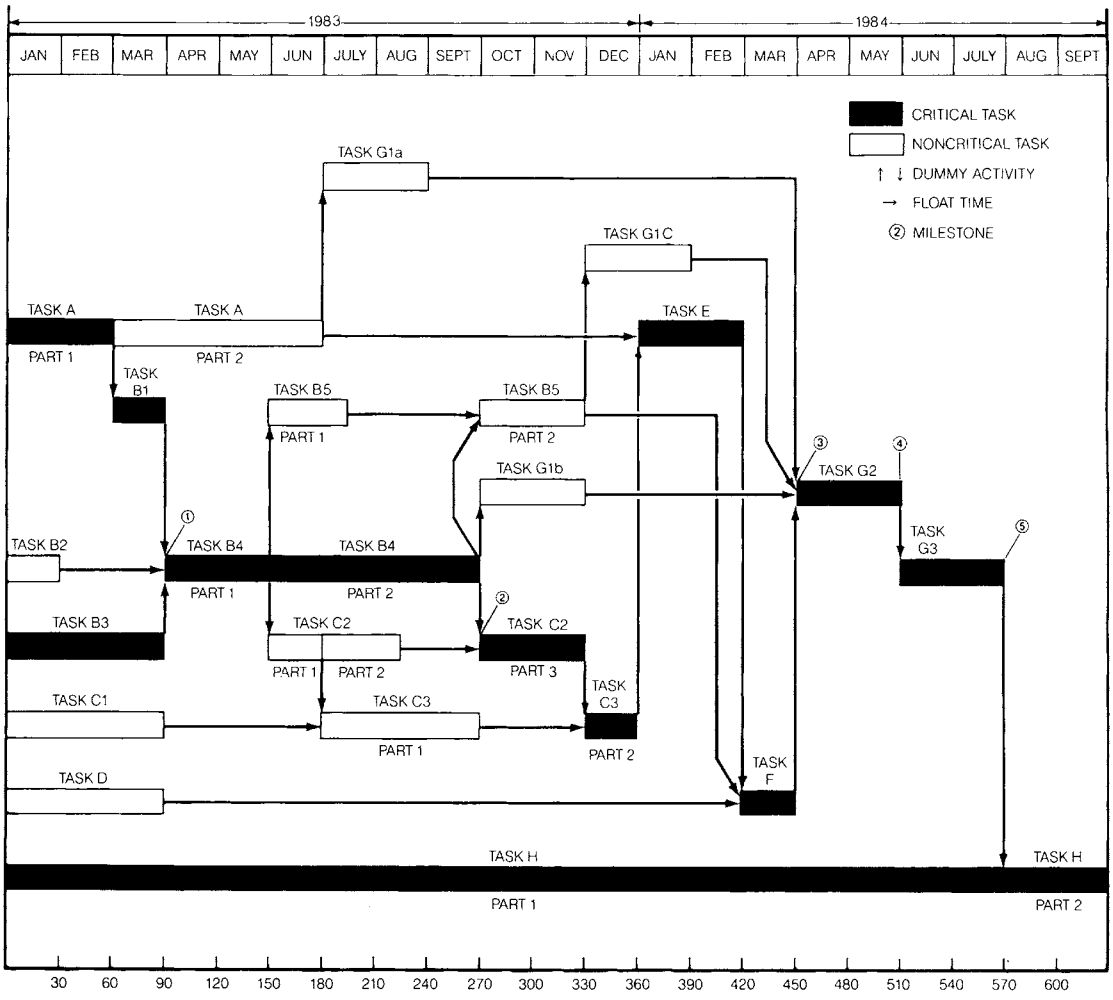


Illustration A-5: Critical Path Diagram



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Chart: Standard Forms of Construction Contract and their Application

Type Of Construction Project Delivery	Contract Form
"Design-Bid-Build"	**CCDC 2** *Stipulated Price Contract*
"Time and Materials"	**CCDC 3** *Cost Plus Contract (percentage or fixed fee)*
"Maximum Upset Price"	**CCDC 3** *Cost Plus Contract (guaranteed maximum price)*
Unit Rates	**CCDC 4** *Unit Price Contract*
Construction Management	**CCDC 5a** *Construct Management Contract — For Services* **CCDC 5b** *Construction Management Contract — For Services and Work*
Design-Build	**CCDC 14** *Design-Build Stipulated Price Contract*
Project Management	n/a

Note: This is a very simplified representation of various types of construction project delivery as well as different pricing mechanisms and contract forms.



2.3 Management of the Project

2.3.3 Cost Planning and Control

Canadian Handbook of Practice for Architects

2.3.3

Introduction
- Providing Advice on Costs
- The Role of the Architect in Cost Planning and Control
- Formats for Presentation of Cost Information
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Methods of Preparing Cost Estimates
- General
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Life Cycle Costs

Value Analysis or Value Engineering

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Definitions

References

Appendix — Description of the Classes of Estimates used by PWGSC for Construction Costing of Building Projects

Cost Planning and Control

Introduction

The capital cost for the construction of the project is generally established by the client during the pre-design phase, expressed in terms of a construction budget corresponding to the relative size of the building.

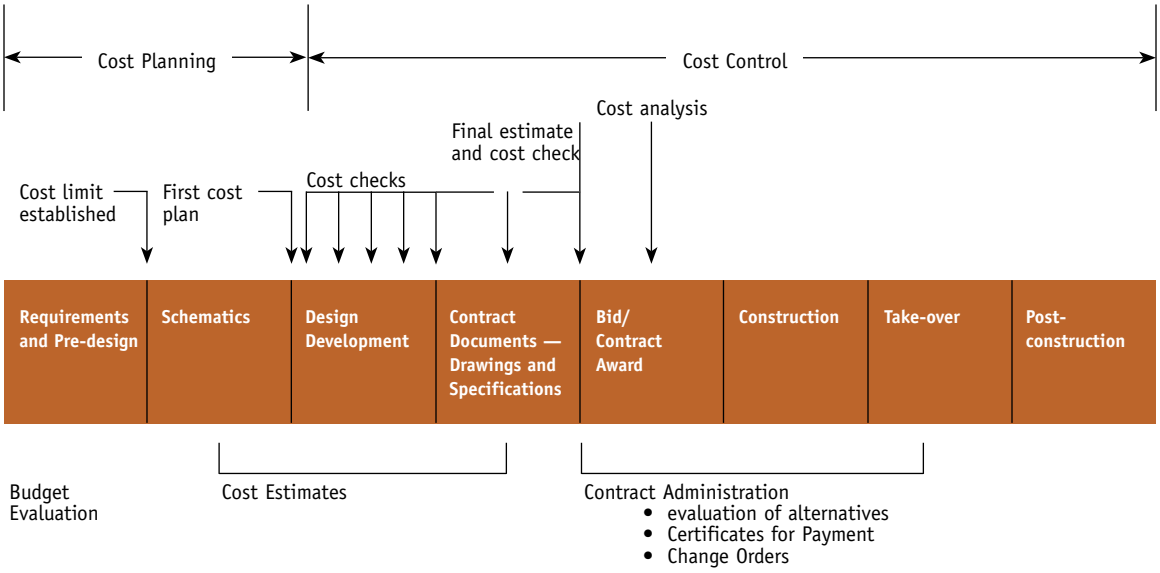
The importance of cost planning and control in the delivery of professional architectural services cannot be overemphasized. Clients are unlikely to allow their architect to proceed unless the architect first estimates the cost of a venture and then monitors the process. Cost management is more common today because of increased expertise in this field and the availability of sophisticated analytical tools.

Providing Advice on Costs

In most client-architect agreements, one responsibility of the architect is to prepare a construction cost estimate. This estimate is **neither a quotation nor a guarantee**. Due to the variable market conditions, the architect should never guarantee or warrant a construction cost estimate. In fact, such a warranty could void any professional liability insurance policy. Nevertheless, the architect is expected to deliver the normal, professional standard of care in preparing cost estimates and providing cost advice.

Whenever suitably experienced personnel are not available in-house, architects or owners should hire the best available cost consultants. If preferred, the architect or cost consultant should form an alliance with business associates who are contractors or in the development industry, or they should establish an ongoing relationship with a quantity surveyor.

Illustration 1: Cost Planning and Control by Project Stages



The Role of the Architect in Cost Planning and Control

To ensure that the project will be well-defined and realized within a predicted cost limit, cost planning (also known as cost control, cost analysis, or cost management) requires:

- effective cost estimating;
- financial analysis of various components;
- management of the design and construction documentation process.

Cost planning (or the preparation of construction cost estimates) is done in the predesign and design stages, whereas cost control (or the monitoring of construction costs) is done at the later stages. Refer to Illustration 1.

Formats for the Presentation of Cost Information

The client usually summarizes overall project costs in a "Global" or Project Budget which:

- lists all expenditures needed to complete every aspect of the venture;
- incorporates information provided by the architect for the construction component of the budget with a detailed breakdown.

Refer to Illustration 2 which suggests some of the "global" and "soft" costs that must be considered.

Prior to delivering cost advice on a regular basis, the architect should:

- make the provision of cost advice and project cost management a priority;
- make specific efforts to become knowledgeable;
- develop in-house experience and skills;
- maintain up-to-date records of historic cost data;
- emphasize to clients the importance of cost estimating and related services.

To ensure effective cost management, every team member must be vigilant about the effect that all design, detailing or specification decisions could have on the cost of individual components of the project, estimated during the initial budget preparation. The project manager will:

- initiate and control the preparation of cost information;
- manage team members to ensure that the work stays within the agreed-upon budget;
- set or adjust limits;
- exercise maximum influence on decisions affecting costs.

Once equipped with access to reliable and current cost information available at all stages of a project, architects should:

- use this resource with confidence;
- express information in standard formats;
- be consistent and methodical;
- avoid ambiguity;
- list all assumptions clearly whenever cost information is published;
- promptly confirm in writing any cost information provided verbally;
- consider providing references and comparable projects when issuing information;
- start a cost information file for each project and keep it updated;
- analyze each project on completion (refer to Chapter 2.3.1, *Management of the Project*);
- maintain files containing reliable historic cost data;
- check historic cost data in detail to ensure comparability with the current project.

Liability of the Architect

In an architectural practice, liability for incorrect cost estimates cannot be avoided, whether or not the architect is acting as the project manager or is providing limited services with no management responsibilities.

Methods of Preparing Cost Estimates

General

Cost forecasting is an important and rigorous activity. All cost estimates:

- work on the principle of forecasting based on **historic** data;
- require that the original data be selected, carefully and methodically, by experienced personnel.

The success of any method depends on:

- the **reliability** of the raw historic data:
- the ability to **adjust** the data to suit the characteristics of the new project and to market conditions;
- the **similarity** of the new project in as many ways as possible to the examples from which data are available;
- the extent to which the analysis is broken down into a large number of **small components**, instead of a few large unit headings.

Therefore, historic data must contain as much descriptive detail as possible, so that differences may be identified and precise adjustments made.

Classes of Cost Estimates

Government and institutional clients commonly use this method, and usually refer to these estimates as Class "C" Estimate, Class "B" Estimate, etc. Refer to "Appendix — Description of the Classes of Estimates used by PWGSC for Construction Costing of Building Projects" at the end of this chapter. From the outset of the project, cost information is arranged under the standard **MasterFormat**™ divisions, which uses the typical trade and supplier headings that will eventually be used during construction. This same format is usually used by contractors for preparing tenders and for the preparation of applications for payment. The data in this format simplify retrieval (from files or electronic sources) for calculating detailed budgets for the next project.

The following is a description of each level:

- Cost Estimate Class D:
- *Functional Program*

- Prepared prior to commencement of the design;
- based on
  the functional program and historic data;
  adjusted to take into account assumptions
  regarding inflation, location, risk, quality, size and project timing;
- a rough order of magnitude.

Cost Estimate Class C:
Schematic Design

- prepared at an early stage in the project, when drawings are preliminary in nature;
- based on:
  type of construction;
  quantities of materials;
- includes all assumptions or qualifications to the estimate;
- includes a relatively large design contingency allowance which is used to provide for changes in scope and because information is more limited.

Cost Estimate Class B:
Design Development

- the estimating process is repeated when additional specification and drawing information becomes available, using an expanded format under the original headings;
- the reduction in uncertainty made possible by better information from the design team allows for a reduced design contingency allowance.

Cost Estimate Class A:
Construction Documentation

- as the construction documents become more complete, the process continues and the contingency allowance is reduced further.

Advantages:
- the most reliable method if undertaken carefully from the start;
- well-suited when cost advice is being supplied to the architect by contractor/construction managers and suppliers;
- the information stays current and relevant throughout pre-construction;
- project leaders can build up a history of, and the knowledge and skills for, cost estimating — especially if building projects are similar within the architectural practice.

Disadvantages:
- requires an estimator with both design and construction experience;
- requires the ability to foresee all the typical trades needed to complete the building.

Refer to Illustration 3 for an application of this estimating method.

Illustration 2: Project Budget

Typical Industrial Manufacturing Building	Original Budget	Variance	Last Budget	Variance	Current Reporting Budget	Notes
Land						
Land purchase price	$ -	0	$ -	0	$ -	
Land transfer tax	$ -	0	$ -	0	$ -	
Legal fees	$ -	0	$ -	0	$ -	
Construction						
Building	$ -	0	$ -	0	$ -	
Contingency	$ -	0	$ -	0	$ -	
Equipment	$ -	0	$ -	0	$ -	
Racking	$ -	0	$ -	0	$ -	
Permit	$ -	0	$ -	0	$ -	
Insurance	$ -	0	$ -	0	$ -	
Parkland dedication	$ -	0	$ -	0	$ -	
Development charges	$ -	0	$ -	0	$ -	
Sewer impost levy	$ -	0	$ -	0	$ -	
Service connections	$ -	0	$ -	0	$ -	
Owners FF&E	$ -	0	$ -	0	$ -	
General contractors bonding	$ -	0	$ -	0	$ -	
Design						
Architect	$ -	0	$ -	0	$ -	
Structural Engineer	$ -	0	$ -	0	$ -	
Mechanical Engineer	$ -	0	$ -	0	$ -	
Electrical Engineer	$ -	0	$ -	0	$ -	
Soils Test/Environmental	$ -	0	$ -	0	$ -	
Landscape Consultant	$ -	0	$ -	0	$ -	
Equipment Engineer	$ -	0	$ -	0	$ -	
Cost Planning	$ -	0	$ -	0	$ -	
Surveyor	$ -	0	$ -	0	$ -	
Misc. fees	$ -	0	$ -	0	$ -	
Legal & Administration						
Legal fees	$ -	0	$ -	0	$ -	
Development Management	$ -	0	$ -	0	$ -	
Project Management	$ -	0	$ -	0	$ -	
Realty Taxes	$ -	0	$ -	0	$ -	
Site Plan & Misc. costs	$ -	0	$ -	0	$ -	
Marketing/Pre-opening/ Commissions						
Marketing/sales/ leasing commissions	$ -	0	$ -	0	$ -	
Utilities prior to opening	$ -	0	$ -	0	$ -	
Commissions	$ -	0	$ -	0	$ -	
Finance						
Commitment fees	$ -	0	$ -	0	$ -	
L.C. fees	$ -	0	$ -	0	$ -	
Project Manager	$ -	0	$ -	0	$ -	
Interim finance	$ -	0	$ -	0	$ -	
Appraisal	$ -	0	$ -	0	$ -	
Contingency						
Design contingency	$ -	0	$ -	0	$ -	
Construction contingency	$ -	0	$ -	0	$ -	
Escalation						
Government Taxes						
GST on monthly payments		0		0		
GST monthly input credits		0		0		
Project Total	$ -	0	$ -	0	$ -	

Illustration 3: Uniformat Estimates

Summary Page Budget Status	Schematic Design Level 1 Budget	Contingency	Variance %	Design Developmt Level 2 Budget	Contingency	Variance %	Construction Documents Level 3 Budget	Contingency
1. General requirements	$ -	$ -	0%	$ -		0%	$ -	
2. Site Work	$ -		0%	$ -		0%	$ -	
3. Concrete	$ 65,000	$ 15,000	115%	$ 75,000	$ 7,500	107%	$ 80,000	$ 4,000
4. Masonry	$ -		0%	$ -		0%	$ -	
5. Metals	$ -		0%	$ -		0%	$ -	
6. Wood and Plastics	$ -		0%	$ -		0%	$ -	
7. Thermal and Moisture Protection	$ -		0%	$ -		0%	$ -	
8. Doors and Windows	$ -		0%	$ -		0%	$ -	
9. Finishes	$ -		0%	$ -		0%	$ -	
10. Specialties	$ -		0%	$ -		0%	$ -	
11. Equipment	$ -		0%	$ -		0%	$ -	
12. Furnishings	$ -		0%	$ -		0%	$ -	
13. Special Construction	$ -		0%	$ -		0%	$ -	
14. Conveying	$ -		0%	$ -		0%	$ -	
15. Mechanical	$ -		0%	$ -		0%	$ -	
16. Electrical	$ -		0%	$ -		0%	$ -	
Total Construction Contingency %	$ -		0%	$ -		0%	$ -	
Total Construction	**$ -**		**0%**	**$ -**		**0%**	**$ -**	

3 Concrete Budget Status	Schematic Design Level 1 Budget	Contingency	Variance %	Design Developmt Level 2 Budget	Contingency	Variance %	Construction Documents Level 3 Budget	Contingency
STRUCTURAL CAST-IN-PLACE FORMWORK				$ 20,000				
Accessories							$ 1,500	$ 75
Expansion joints							$ 1,000	$ 50
Elevated slabs							$ 10,000	$ 500
Footing							$ 2,000	$ 100
Slab on Grade							$ 2,000	$ 100
Walls							$ 2,500	$ 125
Stairs							$ 4,000	$ 200
CONCRETE REINFORCEMENT				$ 10,000				
Reinforcing steel							$ 9,000	$ 450
W.W. Fabric							$ 3,000	$ 150
CAST-IN-PLACE CONCRETE				$ 35,000				
Admixtures							$ 1,000	$ 50
Ready Mix							$ 17,000	$ 850
Elevated slabs							$ 7,000	$ 350
Footings							$ 2,000	$ 100
Slab on Grade							$ 5,000	$ 250
Walls							$ 2,000	$ 100
Stairs							$ 3,000	$ 150
CONCRETE FINISHING				$ 10,000				
Floors							$ 6,000	$ 300
Walls							$ 2,000	$ 100
TOTAL DIVISION 3 — CONCRETE	**$ 65,000**	**$ 15,000**		**$ 75,000**	**$ 7,500**		**$ 80,000**	**$ 4,000**

Elemental Costs

Quantity surveyors often use the elemental cost method as the standard format for presenting cost information. This method:

- divides the building into major elements such as structure, exterior closure;
- uses these elements to provide a cost framework which is useful throughout the life of the project;
- is applicable to new or existing buildings;
- uses these elements to form the basis for applying relevant cost information from similar projects.

Advantages:
- the process assumes that the approximate size of a building is known;
- the process can proceed without construction drawings and specifications;
- particularly useful for architects during design development, when trade-offs between elements can be considered to improve the quality of the project without compromising the total budget.

Disadvantages:
- cuts across the traditional construction trade areas (refer to "Classes of Cost Estimates" section above);
- can be difficult to double-check information from real project data without complex, time-consuming analysis.

The elemental cost method is best left to quantity surveyors or those experienced in the calculation of building costs, unless the architect has extensive in-house records which have been analyzed and are easily accessible.

Refer to Illustration 4 for a typical elemental cost forecast.

Area
(Cost per m^2/per ft^2)

The terms "cost per square metre/per square foot" are used throughout the development and construction industries, and are recognized by public and private institutions and the public at large. Both imperial and metric measurements continue to be used.

Extensive floor area cost data are available from a number of sources as a basis for interpolation and use in forecasting. These should be used when providing general cost advice and for the calculation of overall project costs.

Advantages:
- the concept of "floor area" is easily understood and applicable to all buildings;
- costs for an individual component or element of a building, or for the entire structure, are straightforward to calculate;
- very simplified historic cost information, expressed as costs per m^2/per ft^2 for completed projects, is available for many different building types.

Disadvantages:
- does not account for unique conditions or special construction;
- is simplistic and can be misinterpreted.

The architect should limit the use of this basic information by using it only as a general guide at the pre-design stage.

Refer to Illustration 5 for typical data provided for preparing a construction cost estimate based on area.

Volume
(Cost per m^3)

This method is not widely used, except:

- for certain specialized building types such as warehousing (particularly freezer buildings);
- for multi-storey buildings where the floor area method might not adequately reflect the true costs;
- as a double-check on the other methods being used.

Unit Use
(Cost per bed, cost per seat, etc.)

This method uses very simplified historic data as a basis for calculating cost. It is brief, to the point, and relatively reliable — provided that the historic data on projects are comparable. This method is useful for preliminary budgeting because the result is general in nature and more obviously "approximate."

Illustration 4: Elemental Cost Forecast

	Typical Example of Elemental Format using Canadian Institute of Quantity Surveyors Measurement and Pricing Method	Elemental Quantity SF	Elemental Unit Rate $/SF	Elemental Amount	Cost/SF $/SF	Total $	%
A	**SHELL**						
	A1 SUBSTRUCTURE						
	A11 Foundation	252,800	$ 3.75	$ 948,000	$ 3.39	$ 948,000	3.96%
	A12 Basement Excavation	0	$ -				
	A2 STRUCTURE						
	A21 Lowest floor construction	252,800	$ 10.00	$ 2,528,000	$ 9.03		
	A22 Upper floor construction	27,205	$ 11.98	$ 325,916	$ 1.16		
	A23 Roof construction	252,800	$ 12.00	$ 3,033,600	$ 10.83	$ 5,887,516	24.61%
	A3 EXTERIOR ENCLOSURE						
	A31 Walls below grade	0	$ -	$ -	$ -		
	A32 Walls above grade	64,800	$ 7.99	$ 517,752	$ 1.85		
	A33 Windows & Entrance	1,656	$ 50.12	$ 82,999	$ 0.30		
	A34 Roof coverings	252,800	$ 4.00	$ 1,011,200	$ 3.61		
	A35 Projections	64,800	$ 0.77	$ 49,896	$ 0.18	$ 1,661,847	6.95%
B	**INTERIORS**						
	B1 PARTITIONS						
	B11 Partitions	179,915	$ 7.19	$ 1,293,589	$ 4.62	$ 1,525,589	6.38%
	B12 Doors	232 no	$ 1,000.00 ea	$ 232,000			
	B2 FINISHES						
	B21 Floor Finishes	266,005	$ 2.00	$ 532,010	$ 1.90	$ 747,742	3.13%
	B22 Ceiling Finishes	266,005	$ 0.38	$ 101,082	$ 0.36		
	B23 Wall Finishes	424,630	$ 0.27	$ 114,650	$ 0.41		
	B3 FITTING & EQUIPMENT						
	B31 Fitting & Fixtures	280,005	$ 0.18	$ 50,401	$ 0.18		
	B32 Equipment	280,005	$ 0.45	$ 126,002	$ 0.45		
	B33 Conveying Systems	0	$ -	$ 50,000	$ 0.18	$ 226,403	0.95%
C	**SERVICES**						
	C1 MECHANICAL	280,005	$ 22.50	$ 6,300,113	$ 22.50	$ 6,300,113	26.33%
	C11 Plumbing & Drainage						
	C12 Fire Protection						
	C13 HVAC						
	C14 Controls						
	C2 ELECTRICAL	280,005	$ 6.00	$ 1,680,030	$ 6.00	$ 1,680,030	7.02%
	C21 Service & Distribution						
	C22 Lighting, Devices & Heating						
	C23 Systems & Ancillaries						
NET BUILDING COST excluding site					**$ 67.78**	**$ 18,977,239**	**79.31%**
D	**SITE**						
	D1 SITE WORK			$ 1,300,000	$ 4.64	$ 1,300,000	5.43%
	D11 Site Development			$ 1,000,000	$ 3.57		
	D12 Mechanical Site services			$ 200,000	$ 0.71		
	D13 Electrical Site services			$ 100,000	$ 0.36		
	D2 ANCILLARY WORK				$ -	$ -	
	D21 Demolition			$ -	$ -		
	D22 Alterations			$ -	$ -		
NET BUILDING COST including site					**$ 72.42**	**$ 20,277,239**	**84.75%**
Z	MARK UPS						
	Z1 GENERAL REQUIREMENTS						
	Z11 General requirements	7%		$ 1,419,406.74	5.06930978	$ 1,419,407	5.93%
TOTAL CONSTRUCTION ESTIMATE excluding contingency							
	Z2 CONTINGENCIES	11%		2,230,496.303	$7.97	$ 2,230,496	9.32%
	Z21 Design contingency	0%					
	Z22 Escalation contingency	6%		1,216,634.347	$ 4.35		
	Z23 Construction contingency	5%		1,013,861.956	$ 3.62		
GOODS AND SERVICES TAX		EXCLUDED				$ -	
TOTAL CONSTRUCTION ESTIMATE including Allowances					**$ 85.45**	**$ 23,927,142**	**100.00%**
Gross Floor Area 280 000 sf							

Advantages:

- provides a quick reference or check at the early design stages.

Disadvantages:

- projects are rarely identical, so careful adjustment must be made for differences;
- the circumstances, location, and date of construction may render the historic information of questionable value, even though the projects may be very similar in physical form;
- the calculation of differences may require extensive analysis of the information using some of the other methods referred to above (sometimes, this is best done by quantity surveyors).

Architects should:

- use this method with caution, for preliminary advice only, and as a convenient double-check for comparison purposes;
- spell out clearly all qualifications and assumptions when the information is released.

Do not confuse *unit use* with the term *unit cost* which can be expressed in a number of different numerical unit forms and is a technique used for calculating building and component costs:

Unit Cost	e.g., Concrete curbs:	$13 lf (linear foot)
	Lavatory — wall hung	$1,090 ea (each)
Unit Use	e.g., 2,000 seat cinema	@ $1,500 per seat
	60-room motel	@ $125,000 per room

Illustration 5: Typical Data used in the Area Method Cost Forecast

Typical Page From Toronto Real Estate Board Schedule of Unit Costs' price $ 10.00		Jan-97 per/SF	Jan-97 per/SM	Jan-96 per/SF	Jan-96 per/SM	Jan-95 per/SF	Jan-95 per/SM	Jan-94 per/SF	Jan-94 per/SM
1 INDUSTRIAL BUILDING									
16 ft clear height	Under 10 000 sf	**$ 55.51**	$ 597.29	**$ 55.01**	$ 591.91	**$ 53.93**	$ 580.29	**$ 51.03**	$ 549.08
	10 000 - 20 000 sf	**$ 46.11**	$ 496.14	**$ 45.70**	$ 491.73	**$ 44.80**	$ 482.05	**$ 42.39**	$ 456.12
	20 000 - 50 000 sf	**$ 38.31**	$ 412.22	**$ 37.96**	$ 408.45	**$ 37.22**	$ 400.49	**$ 35.22**	$ 378.97
	50 000 - 150 000 sf	**$ 33.24**	$ 357.66	**$ 32.94**	$ 354.43	**$ 32.29**	$ 347.44	**$ 30.56**	$ 328.83
	Over 150 000 sf	**$ 31.31**	$ 336.90	**$ 31.03**	$ 333.88	**$ 30.42**	$ 327.32	**$ 28.78**	$ 309.67
18 ft clear height	Under 10 000 sf	**$ 57.49**	$ 618.59	**$ 56.97**	$ 613.00	**$ 55.85**	$ 600.95	**$ 52.85**	$ 568.67
	10 000 - 20 000 sf	**$ 47.55**	$ 511.64	**$ 47.12**	$ 507.01	**$ 46.20**	$ 497.11	**$ 43.72**	$ 470.43
	20 000 - 50 000 sf	**$ 39.27**	$ 422.55	**$ 38.91**	$ 418.67	**$ 38.15**	$ 410.49	**$ 36.10**	$ 388.44
	50 000 - 150 000 sf	**$ 33.84**	$ 364.12	**$ 33.54**	$ 360.89	**$ 32.88**	$ 353.79	**$ 31.11**	$ 334.74
	Over 150 000 sf	**$ 31.62**	$ 340.23	**$ 31.33**	$ 337.11	**$ 30.72**	$ 330.55	**$ 29.07**	$ 312.79
22 ft clear height	Under 10 000 sf	**$ 58.45**	$ 628.92	**$ 57.92**	$ 623.22	**$ 56.78**	$ 610.95	**$ 53.73**	$ 587.13
	10 000 - 20 000 sf	**$ 48.22**	$ 518.85	**$ 47.79**	$ 514.22	**$ 46.85**	$ 504.11	**$ 44.33**	$ 476.99
	20 000 - 50 000 sf	**$ 40.80**	$ 439.01	**$ 40.43**	$ 435.03	**$ 39.64**	$ 426.53	**$ 37.51**	$ 403.61
	50 000 - 150 000 sf	**$ 34.46**	$ 370.79	**$ 34.15**	$ 367.45	**$ 33.48**	$ 360.24	**$ 31.68**	$ 340.88
	Over 150 000 sf	**$ 32.94**	$ 354.43	**$ 32.64**	$ 351.21	**$ 32.00**	$ 344.32	**$ 30.28**	$ 325.81
25 ft clear height	Under 10 000 sf	**$ 59.00**	$ 634.84	**$ 58.47**	$ 629.14	**$ 57.32**	$ 616.76	**$ 54.24**	$ 583.62
	10 000 - 20 000 sf	**$ 49.67**	$ 534.45	**$ 49.23**	$ 529.71	**$ 48.26**	$ 519.28	**$ 45.67**	$ 491.41
	20 000 - 50 000 sf	**$ 41.11**	$ 442.34	**$ 50.74**	$ 545.96	**$ 39.94**	$ 429.75	**$ 37.79**	$ 406.62
	50 000 - 150 000 sf	**$ 34.48**	$ 371.00	**$ 34.17**	$ 367.67	**$ 33.50**	$ 360.46	**$ 31.70**	$ 341.09
	Over 150 000 sf	**$ 33.22**	$ 357.45	**$ 32.92**	$ 354.22	**$ 32.27**	$ 347.23	**$ 30.54**	$ 328.61

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Additional information contained in *Schedule of Unit Costs* can be obtained through the Toronto Real Estate Board.

Factors Affecting Costs

Economic and Political

Several factors influence the construction industry and affect building costs. These factors include:

- inflation;
- market conditions;
- other economic factors;
- political and social climate.

Inflation

Due to economic cycles, inflation and the consequent escalation of construction costs can vary depending on the era and the economic factors affecting Canada and the world. Because inflation is a factor of the cyclical economic system, especially for construction, architects should:

- always include an allowance for escalation as a line item in the project budget;
- be aware of the trend during the past 12 months as well as predictions for the future;
- indicate a reference date on all estimates
- seek input from the client.

Market Conditions

Periodically, there is so much demand for construction that it can become almost impossible to obtain competitive tenders for a project. This situation results in inflated costs. At the other extreme, construction costs during recessions — particularly for non-union labour rates — may decrease significantly. Such decreases can be followed by a rapid rise in costs shortly after the end of the recession.

Other Economic Factors

- the use of union or non-union labour;
- interest rates on financing costs;
- large demand for certain building materials;
- exchange rates between nations, for projects with a significant proportion of imported materials and equipment.

Political and Social Climate

In Canada, the political climate (local, provincial, and federal) can affect the timing of a project approval, especially around election time.

Abroad, in countries where democracy and respected institutions are stable, commercial activity can flourish, and competition and true supply and demand will occur. In certain areas of the world — where some or all of these factors may be missing — stability is often lacking and construction prices will tend to be erratic and unpredictable.

Prior to using any raw cost data for estimates, architects and cost consultants should consider all the above factors and make suitable corrections.

Environmental

Construction costs are affected by several environmental factors:

- site characteristics;
- weather, and season of the year;
- location.

Site Characteristics

- challenging topography;
- natural or built features;
- unusual soil or sub-surface conditions;
- existence of hazardous wastes, including asbestos, PCBs;
- contaminated soils requiring removal and/or environmental certification;
- disposal costs of contaminated soils;
- adjacent buildings.

Weather and Season

- cost and construction procedures in Canada are significantly influenced by the weather and season;
- construction activities are cyclical over each 12-month period (reduced activity from December through March for exterior construction and excavation);
- winter protection and provision of temporary heating adds to cost.

Location

- site characteristics (for example, a project in a suburban location will cost less compared to one in a constricted downtown core — where overhead can be much higher because of parking charges, traffic congestion causing loss of time and delivery delays, and the likelihood of more stringent regulatory requirements);
- construction in remote areas where skilled labour is unavailable;

- distance to sources of supply for materials and trades;
- use of components that are manufactured at some distance from the site;
- travel distance to dump/disposal sites or recycling depots.

Building Type and Design

Building types range from simple wood-framed structures to complex, technically sophisticated buildings such as hospitals and laboratories. Some costing handbooks classify building costs under as many as several dozen different types. Construction costs vary considerably ($575-$3,700 per m2/$55-$350 per ft2 in Canadian dollars).

Features affecting cost include:

- compliance with building codes;
- method of construction (for example, wood, reinforced concrete or steel frame);
- building height and number of storeys;
- building form (a compact building is less expensive than one with the same area that is long and narrow);
- type and range of finishes;
- choice and arrangement of structural, mechanical, and electrical systems;
- the planned life of the structure;
- selection of components (standard or off-the-shelf vs. custom-manufactured);
- sustainable design requirements such as material selection and requirements for certification.

Characteristics of the Owner/Client

Architects need to recognize the impact that the type of owner can have on the cost of a project.

Sophisticated clients, such as commercial and industrial corporations or developers who regularly procure design services and construction, frequently expect the delivery of completed projects at or below target costs.

Other owners, such as certain institutions and government agencies, have entrenched bureaucratic procedures that effectively preclude taking advantage of a competitive system. Some owners are unable or unwilling to avoid certain factors which can contribute significantly to project costs.

These factors include:

- design requiring high standards of quality or rigorous quality control procedures (especially long life cycle, redundancies in spaces);
- complex bidding procedures;
- insurance requirements above the norm;
- extensive bonding requirements;
- poorly written, sometimes inequitable, non-standard contract wording;
- long delays in issuing payments to contractors.

The architect should consider adjusting the estimate based on the type of organization the client represents.

Definition of Project Requirements (Functional Program)

Refer to Chapter 2.3.4, *Pre-design*.

The functional program defines the project. To minimize the possibility of cost overruns resulting from changes in the program, review the functional intent or objectives. Ask the owner to clarify any incomplete or unclear requirements prior to providing any architectural service.

Changes in the scope of a project can occur for many reasons, including:

- the development of more specific detailed requirements by the owner;
- external factors such as new technological developments, new legislation or a change in market conditions;
- lack of sufficient detailed information;
- a change in client personnel, building users or stakeholders;
- inadequate research prior to developing the program;
- the addition of new partners or stakeholders.

Cost increases due to changes in the program can be significant for the owner and the architect at any time, but especially in the construction documentation stage, when re-design costs and additional consulting fees arise. Refer to Illustration 7.

The architect should always keep the owner fully advised of the potential cost implications of any changes.

Type of Construction Project Delivery

Contractual relationships between the owner and the contractor can have an impact on the cost of a project. Refer to Chapter 2.3.2, *Types of Construction Project Delivery*.

Owner's Responsibilities and Timetable

The owner frequently has requirements which can affect the construction budget. In all cases, these should be discussed and approval subsequently sought from the owner. Some of these circumstances include:

- a project schedule that is accelerated to suit an owner's critical date, such as a school opening or the timing of an event due to market forces;
- late commencement due to reasons beyond the owner's control, for example, winter conditions, resulting in additional construction costs;
- delayed commencement of a project during a time of inflation and currency fluctuations;
- owners approval process.

Architects are advised to:

- ensure that assumptions attached to any forecasts include reference to specific timing;
- check and make adjustments for specific issues that may influence the cost of the project when using historic cost data.

Other Factors

Regulations:

- onerous bureaucratic requirements, such as planning regulations or site development agreement conditions;
- numerous building code occupancy classifications within one building;
- hazardous demolition, such as removal of asbestos;
- recycling regulations and dumping charges (tipping fees) for demolition or construction debris.

Inconvenient or unusual work arrangements:

- construction must be scheduled around the ongoing activities of occupants in buildings such as hospitals, court houses, shopping malls or restaurants; because these activities bear little relationship to the logic of construction, overtime labour costs often result;
- additional protection and clean-up expenditures beyond normal requirements;
- work adjacent to or within certain building types may be subject to limitations on scheduling and on the times when equipment, such as cranes, may be used;
- demolition and shoring of existing structures;
- abnormal construction phasing.

When developing the cost plan of a project, establish the basic cost of the building. Identify and pull out unusual or site-specific costs and justify the overall project budget during the forecasting process.

Techniques

Cost Consultants

Unless the architect has developed the knowledge and systems in-house, expert advice should be obtained either from:

- independent professional experts (quantity surveyors); or
- those intimately involved in everyday construction (development/construction experts).

Quantity Surveyors

Quantity surveyors provide professional service at hourly rates, or at a fixed or percentage fee of the construction budget.

Advantages:

- independent professional status;
- their success is based upon their track record of reliability in forecasting;
- up-to-date archival material that is very extensive for many different building projects and is easily accessible;
- quantity surveyors will usually supply information on comparable projects as a double-check to establish credibility;
- some larger companies publish their own updated forecast information yearly.

Disadvantages:

- unit costs are usually historical and often not connected to real-time costs making them less current than costs available from contractors or construction managers;
- detailed cost information may not be available because cost breakdowns are limited to major trade divisions.

Cost estimating is as much an art as a science and architects are advised to:

- use the services of a quantity surveyor, whenever appropriate, to increase the quality and depth of the architectural service available within the practice;
- monitor every aspect of their work to ensure that the information being prepared is entirely applicable to the current project and that any qualifications or assumptions accompanying the cost information supplied are precisely in accordance with the client's expectations;
- be satisfied that every item of information is relevant before passing on this advice to the client;
- ensure there are sufficient fees: for coordination when Construction Manager is involved, or value analysis or value engineering is undertaken;
- to include the quantity surveyor's fees or cost estimating. [Note: some clients prefer to engage a quantity surveyor directly; in these situations, the architect should allow for fees for coordination.]

Construction Managers and other Development/ Construction Experts

Other sources of expertise directly from the construction industry include construction managers, contractors, design-builders, and developers.

Advantages:

- results are likely to be reliable for calculating costs for various classes of Cost Estimates using unit costs assigned to area measurements for spot-checking individual elements of a project where the proposed building is very similar to recently completed projects;
- information will be very current because these sources are involved with construction spending every day and because they have access to trades and suppliers who are also specialists;
- these sources monitor trends and are generally aware of the dynamics affecting construction costs.

Disadvantages:

- unlike a quantity surveyor, who is an independent consultant, the builder may not always find it easy to achieve a comprehensive overview;
- this knowledge is sometimes very specialized and "narrow," and may not always be applicable to new situations;
- certain sources may be less reliable due to possible self-interest or commercial motives.

Architects should consider:

- developing an alliance with individuals or companies by working together on common projects before using this source for cost information;
- checking the relevance of all data supplied, even if they have confidence in the information source;
- paying a fee for all cost information from construction industry sources.

It should be noted that when there may be a conflict of interest, information from a "free" source may not be reliable.

Construction Price Index

Construction price index data are usually published by government agencies and private companies. These publications are:

- useful only as a guide to show trends;
- usually some months out-of-date;
- often presented in graph form for ease of communication.

Publications

Construction cost data are available from government agencies, private interest groups, private companies, and quantity surveyors. The information comes in printed or electronic form, and the cost varies considerably depending on the amount of detail, completeness, and ease of use. Data from government agencies are more useful for identifying trends and differences in national, regional, and local costs than for calculating the cost of a specific building.

Refer to Illustration 6 for an example of cost information from a typical publication. Extensive detailed information for most building types can be purchased in hard copy or electronic form. Such publications:

Illustration 6: Typical Cost Information

Model costs calculated for a 1-storey building with 10′ storey height and 4,000 square feet of floor area

Restaurant, Fast Food

			Unit	Unit Cost	Cost Per S.F.	% Of Sub-Total
A. SUBSTRUCTURE						
1010	Standard Foundations	Poured concrete; strip and spread footings	S.F. Ground	2.57	2.57	
1020	Special Foundations	N/A	—	— —		
1030	Slab on Grade	4" reinforced concrete with vapor barrier and granular base	S.F. Slab	4.74	4.74	8.7%
2010	Basement Excavation	Site preparation for slab and trench for foundation and footing	S.F. Ground	.46	.46	
2020	Basement Walls	4' foundation wall	L.F. Wall	78	5.07	
B. SHELL						
B10 Superstructure						
1010	Floor Construction	N/A	—	—	—	6.0%
1020	Roof Construction	Metal deck on open web steel joists	S.F. Roof	8.90	8.90	
B20 Exterior Enclosure						
2010	Exterior Walls	Face brick with concrete block backup *70% of wall*	S.F. Wall	30.86	14.04	
2020	Exterior Windows	Window wall *30% of wall*	Each	45.75	8.92	20.2%
2030	Exterior Doors	Aluminum and glass	Each	3478	6.96	
B30 Roofing						
3010	Roof Coverings	Built-up tar and gravel with flashing; perlite/EPS composite insulation	S.F. Roof	6.10	6.10	4.4%
3020	Rood Openings	Roof hatches	S.F. Roof	.47	.47	
C. INTERIORS						
1010	Partitions	Gypsum board on metal studs *25 S.F. Floor/L.F. Partition*	S.F. Partition	5.78	2.08	
1020	Interior Doors	Hollow core wood *1000 S.F. Floor/Door*	Each	488	.49	
1030	Fittings	N/A	—	—	—	
2010	Stair Construction	N/A	—	—	—	17.6%
3010	Wall Finishes	Paint	S.F. Surface	2.47	1.78	
3020	Floor Finishes	Quarry tile	S.F. Floor	15.36	15.36	
3030	Ceiling Finishes	Mineral fiber tile on concealed zee bars	S.F. Ceiling	6.38	6.38	
D. SERVICES						
D10 Conveying						
1010	Elavators & Lifts	N/A	—	—	—	0.0%
1020	Escalators & Moving Walls	N/A	—	—	—	
D20 Plumbing						
2010	Plumbing Fixtures	Kitchen, bathroom and service fixtures, supply and drainage *1 Fixture/400 S.F. Floor*	Each	3092	7.73	
2020	Domestic Water Distribution	Gas fired water heater	S.F. Floor	4.52	4.52	9.4%
2040	Rain Water Drainage	Roof drains	S.F. Roof	1.65	1.65	
D30 HVAC						
3010	Energy Supply	N/A	—	—	—	
3020	Heat Generating Systems	Incuded in D3050	—	—	—	
3030	Cooling Generating Systems	N/A	—	—	—	12.2%
3050	Terminal & Package Units	Multizone unit, gas heating, electric cooling; kitchen ventilation	S.F. Floor	18.15	18.15	
3090	Other HVAC Sys. & Equipment	N/A	—	—	—	
D40 Fire Protection						
4010	Sprinklers	Sprinklers, light hazard	S.F. Floor	6.12	6.12	5.2%
4020	Standpipes	Standpipe	S.F. Floor	1.66	1.66	
D50 Electrical						
5010	Electrical Service/Distribution	400 ampere service, panel board and feeders	S.F. Floor	4.30	4.30	
5020	Lighting & Branch Wiring	T-8 fluorescent fixtures, receptacles, switches, A.C. and misc power	S.F. Floor	9.89	9.89	12.2%
5030	Communications & Security	Addressable alarm systems and emergency lighting	S.F. FLoor	3.44	3.44	
5090	Other Electrical Systems	Emergency generator, 7.5 kW	S.F. Floor	.38	.38	
E. EQUIPMENT & FURNISHING						
1010	Commercial Equipment	N/A	—	—	—	
1020	Institutional Equipment	N/A	—	—	—	4.1%
1030	Vehicular Equipment	N/A	—	—	—	
1090	Other Equipment	Walk-in refrigerator	S.F. Floor	6.06	6.06	
F. SPECIAL CONSTRUCTION						
1020	Integrated Construction	N/A	—	—	—	0.0%
1040	Special Facilities	N/A	—	—	—	
G. BUILDING SITEWORK N/A						
				Sub Total	148.22	**100%**
	CONTRACTOR FEES (General Requirements: 10%, Overhead: 5%, Profit: 10%))			25%	37.06	
	ARCHITECT FEES			8%	14.82	
				Total Building Cost	**200.10**	

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- provide excellent, comprehensive, and reliable data if used with appropriate qualifications or multipliers;
- are assembled from real project data supplied by owners and contractors from the previous year;
- are available for Canada only, or for all of North America (amounts can be adjusted to the individual cities or regions).

The data may be used for entire buildings or individual components. Note that the data are more reliable for estimating in Canada when obtained from Canadian publications or sources. Data from non-Canadian sources may not be reliable for estimating purposes when the value of the dollar is fluctuating.

Architects should:

- build forecasts using this data carefully and methodically;
- carefully read the descriptions of the scope and cost allowances to ensure that the proposed building estimate is based on a comprehensive list of items which apply exactly;
- become familiar with the format and methods employed prior to using any information.

Contingencies

Theoretically, every budget estimate should predict the actual (final) cost of the completed project. In practice, this means that contingency allowances of decreasing size must be applied to project and construction budgets as relevant information develops during the design process. There are two contingencies and it is important to distinguish between design contingencies and construction contingencies and identify both in any estimate in addition to any escalation amount. Contingencies, which may be as high as 25% at the early stages of a project, will decrease to 2%-5% as the degree of uncertainty is reduced. Construction contingencies for renovation work are higher.

Most government agencies involved in construction, as well as private companies, banks, and other financial institutions, expect a single contingency amount to be shown at the bottom of a budget. This figure, giving the full extent of the contingency allowance, can be plainly seen. However, some project managers prefer the contingency to be apportioned for each line item in addition to showing a general contingency at the end.

Professional Service for Each Phase of the Project

Use a checklist such as the "Checklist for the Management of the Architectural Project" (refer to Chapter 2.3.1, *Management of the Project*) to ensure that all cost estimating tasks are attended to at the appropriate time.

The sections below are a commentary on the lists of tasks.

Phase A. Pre-agreement Phase

By listing all cost-related tasks, the architect:

- ensures that every aspect of spending on the project will be reviewed by either the architect, the client or another party;
- can prepare a complete proposal for services.

The purpose is to:

- make the client aware that this service will be required to complete the entire project;
- identify who will be responsible for investigating and supplying the forecasting information.

Phase B. Schematic Design Phase

In this phase, the architect establishes a preliminary design and a construction cost estimate for the project, based on the most reliable information available at the time from consultants and other specialists. The architect may **either**:

- instruct the design team to continue with conceptual work that will meet or satisfy the agreed-upon budget; **or**
- review the scope, quality and cost for some or all of the building elements to re-define the project to fit within a pre-determined cost limit;
- revise the budget and redefine the scope of the project.

Using up-to-date cost forecasting information, as well as carefully defining the project scope and cost limits for the project elements, will minimize the risk of significant re-design and re-definition later.

Phase C. Design Development Phase

In this phase, the architect may:

- provide for review and updating of the construction cost estimate as the reliability of the design and specifications improves;
- undertake additional analysis, if necessary, to check the construction cost estimate and its assumptions;
- refine the building's scope, design, quality and details, to ensure they will not exceed the limits of the construction cost budget.

Phase D. Construction Documentation Phase

In this phase, the architect may:

- update the construction cost estimate based on the construction documents (often at 50% completion and at 95% completion – the pre-tender stage or at other defined milestones);
- include allowances in the bid documents.

Refer to Chapter 2.3.8, *Construction Documents — Specifications*.

Phase E. Bidding and Negotiation Phase

In preparing the bidding documents, the architect must determine what cost information is needed. The architect must consider the following cost information:

- alternative prices;
- itemized prices;
- unit prices.

Refer also to CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts*.

Traditionally, the architect analyzes the bids. The various "alternative prices" from each bidder must be evaluated and the best overall value for the client determined. The lowest combination of base bid and acceptable alternative prices is normally the choice.

Itemized prices are costs for a specific item or section of work *for information purposes only*. Unit prices should only be requested when an estimated quantity is supplied. Unit prices are typically requested for large civil engineering projects; however, certain components (such as site development work, hidden or indeterminate work) within architectural projects may require unit prices.

Refer also to Chapter 2.3.9, *Construction Procurement*.

RAIC Document Six: The Canadian Standard Form of Contract Between Client and Architect indicates in General Condition 3.4 that if the lowest *bona fide* bid exceeds the construction cost estimate by 15%, the architect shall either:

- obtain approval from the client for an increase in the construction budget;
- re-bid or negotiate;
- modify the construction documents to reduce the construction cost (for no additional fee).

Phase F. Contract Administration Phase

The architect is usually required to determine the amounts owing to the contractor under the contract, based on the architect's observations and evaluation of the progress of the work. The architect then processes the contractor's application for payment and prepares a Certificate for Payment. The elemental cost analysis method is well-suited for use on a comparative basis in assessing the contractor's schedule of values submitted at the outset of the construction phase.

Another architectural service provided during the Contract Administration Phase is the evaluation of the costs of changes. Having ready access to historic cost data, to ensure that the contractor's quotations are realistic, is very important.

Refer also to Chapter 2.3.10, *Contract Administration — Office Functions*.

The architect usually:

- delivers effective cost management service throughout the project;
- provides the owner with regular cost updates and advice (this will occur naturally to some extent during the construction phases when the client receives copies of Proposed Changes, Change Orders, and Certificates for Payment);
- endeavours to maintain the supply of excellent cost advice and well-presented information throughout a project.

Life Cycle Costs

In the past, building costs often considered only initial or capital construction costs and did not always include costs associated with operations and maintenance. Recently, high energy and maintenance costs have highlighted the fact that the "real cost" of a building is not limited to the construction phase. An analysis of life cycle costs is not a basic service but an optional or additional service.

The objective of life cycle costing is to determine the "total cost" of a building over its lifetime. This costing method:

- allows comparisons to be made between alternative components or systems;
- generates an understanding of the design of a project, how it functions, and how costs arise;
- facilitates further development of the design.

Life cycle costing of a building can be expressed as follows:

Total Cost = Capital Cost + Operating Cost + Maintenance Cost

The three types of costs are:

- **capital costs:** the initial cost of constructing the project, including the land, fees, and carrying costs;
- **operating costs:** all expenditures for the servicing of the building during its life period, for example, lighting, energy, management, and insurance;
- **maintenance costs:** those costs associated with repairs and renewals.

The total cost as defined above is relevant to the long-term costs of owning a building and is of special interest to owner-occupiers such as government bodies, condominium corporations, and large institutions.

Before the design development phase begins, the architect should discuss the importance of life cycle costs to the client for the following reasons:

- different construction materials, techniques, and systems have different effective life spans;
- considerable expense can arise during the life of a building to maintain a satisfactory level of performance;
- low construction costs may result in higher maintenance costs later in the life of the building.

Using a pre-determined and agreed-upon "design length of life" as a base, the life cycle costs analysis will:

- assess the initial, maintenance, and replacement costs for each element of a building (for example, different types of mechanical systems and roof membranes can vary significantly in initial cost and in their anticipated serviceable life);
- compare this information with total costs for alternative selections or designs;
- study different combinations of all major elements to identify the best choices to minimize capital cost;
- determine the most advantageous or lowest life cycle cost for the entire structure;
- incorporate operating costs, including energy consumption, in the study.

Architects can effectively undertake most life cycle cost comparison exercises if they have access to adequate cost and material specification information. A more detailed analysis should be undertaken by qualified specialist consultants.

Value Analysis or Value Engineering

Sometimes a project will be subjected to value analysis or value engineering. This service is not a basic service of the architect and is frequently undertaken with the use of an external facilitator. The best time to apply any value analysis is early in the design process. One limitation of value engineering is that it generally does not take into account the architect's logical and sometimes intuitive design process.

Value engineering is a systematic procedure to determine the best or optimum value for investments in a construction project. Value engineering is an analytical approach to modifying features which may add cost to a building but do not contribute to its quality, appearance, useful life or functional performance. Architects usually work with cost consultants and value engineers to compare trade-offs between design concepts, arrangements, materials and finishes, systems, construction techniques as well as capital and life cycle costs. This analysis should begin during the schematic design phase when conceptual drawings and outline specifications are prepared. Ideally, value engineering is planned and scheduled at the outset of a project; however, the architect should be willing to undertake such a study at any stage of the project. As noted above, the best time for value engineering is early in the design process.

Certain project delivery methods are better suited to value engineering and different owners will apply different criteria for such studies. For example, developers or Design-Builders may plan to dispose of an asset soon after construction, with more interest in reducing capital spending and less interest in life cycle costs. Landlords and building owners may be more concerned about reduced operating and maintenance costs as well as lower replacement costs. Lower capital costs are almost always a significant consideration. The objective should be to minimize construction cost while maintaining quality through the substitution of alternative materials and systems.

The owner may choose to engage an independent reviewer, rather than the architect/engineers of record, in the belief that this will be more likely to achieve the desired results. This approach can sometimes result in the substitution of inferior or inappropriate products, simply because they are cheaper, however, this is not true value engineering but rather cost-cutting. In these circumstances, the architect must be informed and given the opportunity to advise the owner on the consequences of the proposed changes.
The architect should document all changes in construction documentation requested by the owner. The architect should provide written comments and recommendations on all changes, and clearly describe the positive and negative aspects of the substitutions.

Embodied Energy Cost Analysis or Embodied Energy Consumption

This type of cost analysis assesses the environmental impacts and energy consumption resulting from the extraction, manufacture, delivery, installation, demolition, and recycling of building materials in buildings.

Increasing emphasis is being placed on the need to conserve natural and manufactured building materials and to reduce the embodied energy contained within all products used in building construction.

Work in this field is frequently undertaken by specialists. Architects are well equipped to develop knowledge and skills in this area of expertise, rather than relinquishing the field to others.

Definitions

Construction Budget: The client's budget for the construction cost, including contingencies for cost increases.

Element: Term used in cost estimating to describe a component of a building, such as *sub-structure* (footings, foundations) or *envelope* (walls and roof).

Estimate: To form and state a general idea of; an opinion or judgement (as to such factors as value, time, size).

Indexing: Applying an index or factor to adjust costs for one geographic region to another. (A typical index might be expressed as a percentage such as 102.7%.)

Project Budget: The client's estimated total expenditure for the entire project. It includes, but is not limited to, the construction budget, professional fees, costs of land, rights of way, and all other costs to the client for the project.

Quantity Survey: A bill of quantities or a detailed listing and quantities of all items of material and equipment necessary to construct a project.

References

American Society for Testing Materials (ASTM). publishes 24 various standards on from the Committee E06.81 on Building Economics.
www.astm.org/COMMIT/SUBCOMMIT/E0681.htm

Canadian Institute of Quantity Surveyors.

Quantity Surveying and Cost Consulting Services: Schedule of Services and Recommended Charges.

Elemental Cost Analysis, Format, Method of Measurement, Pricing, 3rd Edition, 2000.

Method of Measurement of Construction Works, 7th Edition, 2000.

Dell'Isola, Alphonse. *Value Engineering: Practical Applications... for Design, Construction, Maintenance & Operations.* Kingston, MA: R.S. Means Co., Inc., 1998.

Derman, Asher, Ph.D. "Embodied Energy, Air Pollution, and Materials, Part 1." *AIA Environmental Guide.* Washington, D.C.: The American Institute of Architects Press, January 1993.

Foster, Norman *et al. Construction Estimates From Take-Off to Bid.* Third Edition. New York, NY: Hill, 1961.

Kirk, Stephen J. and Alphonse Dell'Isola. *Life Cycle Costing for Design Professionals.* Second Edition. New York, NY: McGraw-Hill, 1995.

REED Construction Data publishes a range statistics and economic information on the construction industry, as well as cost estimating tools and books.
www.canadata.com
www.rsmeans.com

Toronto Real Estate Board. *Schedule of Unit Costs.* Published annually. Toronto, Ont.

Appendix — Description of the Classes of Estimates used by PWGSC for Construction Costing of Building Projects

Class "D" Estimate

This estimate provides an indication of the total cost of the project, based on the user's functional requirements to the degree known at the time. It is based on historic cost data for similar work, suitably adjusted for such factors as: effect of inflation, location, risk, quality, size, and time. All related factors affecting cost are considered to the extent possible. Such an estimate is strictly an indication (rough order of magnitude) of the project total cost and completion date. This estimate is used to establish the *indicative* estimate required by Treasury Board for Preliminary Project Approval. Expected degree of accuracy: 20%.

Class "C" Estimate

This estimate is prepared at the end of the Design Concept stage and is based on updated user requirements, general description of the end built works, preliminary site information and existing conditions, and production. It takes into consideration construction experience and market conditions as well as basic implementation logistics. The estimate includes costs for design, documentation, and construction supervision. Expected degree of accuracy: 15%.

Class "B" Estimate

This estimate is prepared at the end of the Preliminary Design stage and is based upon data (on cost, time, and construction) of a level of precision as is typically available when the design of the major systems and sub-systems of the facility (including outline specifications and preliminary drawings and models), as well as when the results of all site or installation investigations are completed. This estimate also makes allowance for all costs resulting from the anticipated schedule, expected market conditions, and suitable level of contingencies. This estimate is used to establish the *substantive* estimate required by Treasury Board for Effective Project Approval. Expected degree of accuracy: 10%.

Class "A" Estimate

This estimate is based on the B estimate which has been updated concurrently with the development of Construction Documents and is submitted as a final pre-tender estimate. It requires that project systems be designed and specified to near completion, and is based on a realistic construction schedule as well as accurate labour and material costs. This is the final estimate before tender call or construction start. Typically, the total forecast is presented in elemental format and includes all actual associated fees and costs. Expected degree of accuracy: 5%.

(Source: Public Works and Government Services Canada)



2.3 Management of the Project

2.3.4 Pre-design

2.3.4

Canadian Handbook of Practice for Architects

Introduction

The Consultant Team

Feasibility Studies and Business Cases

Functional Programming
- Programming Skills
- Quantitative Factors

Site Evaluation and Analysis
- Data Collection
- Zoning and Other Regulations

Master Planning

Organizational Planning

Financial Planning

Definitions

References

Appendix A – Green Building Rating Systems

Site Evaluation Checklist

Checklists for an Integrated Design Process for Retrofitting Buildings

Checklist: Information Required on Land Surveys

Pre-design

Introduction

By definition, **pre-design** occurs before the commencement of schematic design. Some architects are qualified to provide a range of pre-design services, such as:

- feasibility studies;
- site analysis and selection;
- building surveys, audits, and measured drawings;
- functional programs;
- master plans;
- organizational planning and strategic plans;
- financial and business plans;
- re-zoning;
- organizing an architectural competition;
- arranging for proposal calls.

Some of these services may lead to actual design commissions and building projects; others may not. Many pre-design services are outlined in Schedule A, which is one of the optional schedules that can be affixed to in the *Canadian Standard Form of Contract Agreement Between Client and Architect: RAIC Document Six*. The fees for pre-design services should be determined or negotiated separately from the traditional five phases for a building project.

Refer also to Chapter 2.1.10, *Architectural Services and Fees*.

The Consultant Team

Most pre-design services require special expertise. The challenges for architects in assembling a consultant team include:

- identifying the specialized knowledge and advice required;
- being aware of the full range of their own capabilities as generalists and problem-solvers;
- staying up-to-date in specialized fields.

Most architects are able to:

- provide the broad, detached overview that pre-design involves;
- understand the working environments and requirements of their clients.

On the other hand, providing pre-design services does require some specialization and currency in fields which are different from, but related to, traditional architectural practice. Certain aspects of pre-design may require the skills of specialist consultants. As a result of their training and experience, architects often act as facilitators or leaders of multi-disciplinary teams of consultants providing pre-design services.

Each architectural practice must decide whether it can afford to employ non-architectural expertise in-house, or should offer these services by assembling teams of consultants. Successful pre-design work depends on the selection and management of an appropriate team. In addition to the design professionals, such as engineers and landscape architects, many architects may need to engage outside consultants for some of the following services:

- functional programming;
- urban planning;
- environmental planning;
- geotechnical surveys and analysis;
- historical research;
- space planning;
- cost estimating or quantity surveying;
- real estate appraisal;
- accounting and financial analysis;
- information technology;
- market research;
- management consulting.

Refer also to Chapter 1.2.3, *Consultants*, for a complete list of specialist consultants.

Feasibility Studies and Business Cases

Some architects conduct feasibility studies and business cases as part of their services.

A Business Case is a document that generates the support and participation needed to turn an idea into reality. It should explains what the idea, problem, or opportunity is about; how and who it will impact; what others are doing; and analyze alternatives including the associated impacts, risks and cost/benefit of each alternative; and make recommendations.

The complexity of a business case and time taken to prepare it depends on the nature of the business initiative. The business initiative could, in turn, spawn multiple projects (such as a feasibility study, request for proposals, development and construction, implementation or transition) and each one may warrant their own separate study for funding or resource allocation.

Feasibility studies often incorporate the following information and analysis:

- functional programs, including general space requirements and functional relationships, to identify the scope of a project;
- studies of regulations to determine code and zoning constraints, urban design objectives, and community issues related to a project;
- identification and evaluation of potential sites;
- environmental impact analysis;
- market studies, which forecast demand and also real estate market value of a completed project;
- demographic studies predicting demand and, possibly, preferences and lifestyle trends;
- financial studies identifying:
  - capital, operating, and maintenance costs;
  - sources of revenues, including funds to offset capital and operating costs;
- valuation of land and sites;
- evaluations of existing facilities, including:
  - building envelope;
  - mechanical, electrical, and structural systems;
  - functional adaptability;
  - code compliance;
- life cycle cost projections;
- studies to determine the compatibility of a functional program for a new facility with an existing or renovated building;
- exploration of alternatives, such as the "best" fit of a functional program with several potential sites;
- schedules for:
  - project development;
  - cash flow planning;
  - project phasing or decanting strategies (that is, maintaining a client's operations during changes to an existing facility).

Designing a project is often a very open and consultative process, involving the architect, the client, and various stakeholders.

Architects are required to provide pre-design services and undertake feasibility studies to deal with an increasingly complex regulatory environment. Therefore, feasibility studies may examine:

- official plans and community plans;
- zoning and land-use controls;
- designated activity districts within cities;
- transportation issues;
- heritage districts;
- community organizations and concerns;
- civic design panels;
- building codes;
- environmental issues.

For government clients, feasibility studies could include an exploration of economic partnerships with the private sector, because depending on economic or political conditions, governments may choose to reduce capital spending on public projects.

Clients are increasingly interested in renewing buildings and infrastructures rather than replacing them. In such cases, a feasibility study might assess:

- existing structures and their adaptive re-use for the future;
- the value of heritage conservation.

Functional Programming

A problem well-stated is already half-solved.

This quotation summarizes what an architect does in developing a functional program. Functional programs are also called design briefs, facilities programs, architectural programs, owner's statement of requirements, space needs analyses or, simply, programs.

Time and money can be wasted because of lack of appropriate direction from a client. A functional program, which is developed jointly by the architect and the client, clearly defines the problem. Good functional programs result in better and more effective design solutions.

A functional program describes the requirements which a building must satisfy in order to support and enhance human activities. The programming process seeks to answer the following questions:

- What is the nature and scope of the project parameters, needs and opportunities?
- What information is required to develop a proper architectural response?
- How much and what type of space is needed?
- What space will be needed in the next five to ten years or longer to continue to operate efficiently?

In preparing a functional program, the architect's main task is to examine the client's world in detail so as to define the client's needs and objectives. These requirements will establish criteria for evaluating potential design solutions or other strategic alternatives. The architect must understand:

- the impacts of a building's occupants and processes on the built environment;
- the social impacts of its program on the community;
- the planning impacts of its functions on the local infrastructure.

To prepare a functional program in consultation with the client, architects will usually identify, research, and observe:

- the users of the proposed building and their work activities, including:
  - function-by-function, room-by-room, or department-by-department activity plans;
  - staffing plans;
  - storage requirements;
- previous precedents and similar building types;
- the volume of activity planned for specific facility components, such as:
  - throughput (amount of material put through a manufacturing process);
  - flow patterns and human activities

With this information, the architect can then develop approximate floor areas and technical requirements for the proposed facility, including:

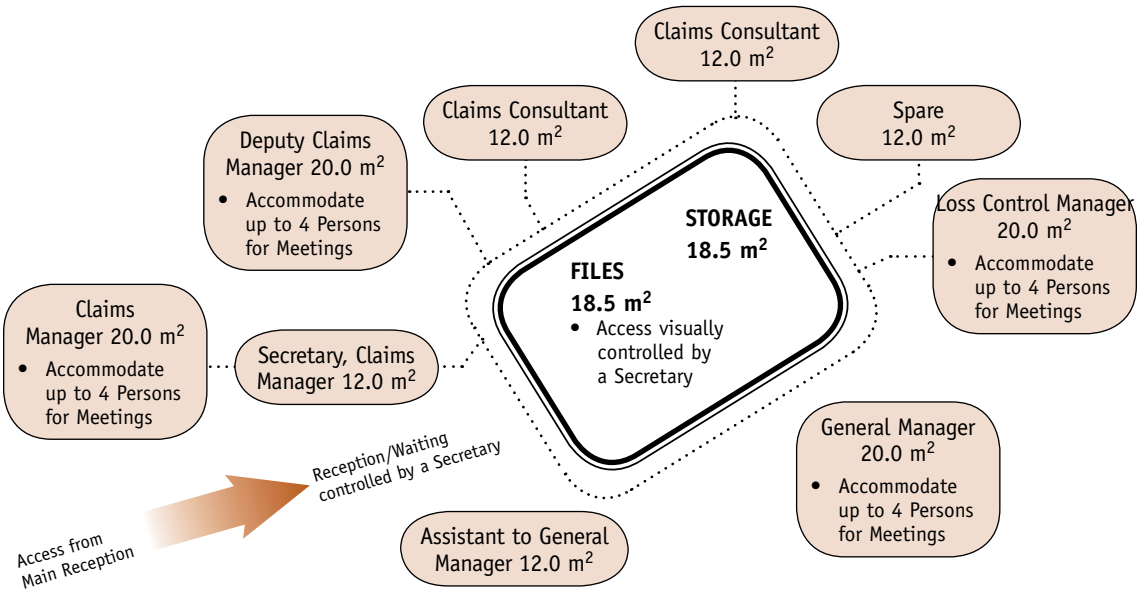
- details of the space or of the workstation;
- special furniture configurations;
- environmental criteria;
- security requirements.

The architect's services could also include advice to the client on alternatives, such as the architectural and financial implications of various building and siting options. Functional programs for buildings are future-oriented — alternative scenarios may be based on high-, medium-, and low-growth projections, or on fast, medium or slow roll-outs of anticipated events. The architect should assist the client in assessing the advantages or benefits — and the disadvantages or costs — of each alternative.

The final functional program is a report which can include some of the following information:

- the client's philosophy, values, goals, and desired "image";
- site requirements, such as parking, circulation, orientation;
- explicit space requirements for the future building, including:
  - definition of the activities which will take place in each space in the building;
  - the functional relationships of the spaces;
  - "bubble" diagrams (see Illustration 1) and flow diagrams;
  - the size of each of the spaces;
  - special technical requirements of each of the spaces, the building systems and equipment;
- financial requirements and a preliminary budget;
- scheduling and time frame for the project;
- other requirements including:
  - regulatory issues such as zoning and

Illustration 1: Typical Bubble Diagram (Spatial Relationship Diagram)



All areas are expressed in square metres

building code requirements;
- other requirements from Authorities Having Jurisdiction;
- community goals and concerns;
- ecological and environmental concerns;

- a recommended construction project delivery method.

Illustration 2 shows a method of presenting some of the space requirements in a functional program.

Functional programs are often prepared as part of a *design brief* — information to be provided to another architect commissioned to design the building. Sometimes, particularly for simple or small projects, the functional program is prepared as part of the schematic design phase of a project.

Architectural fees for functional programming are determined separately and are not part of "basic services."

Programming Skills

Programming requires specific skills. The programmer must develop the ability to understand a client's philosophy, values, and management style in areas such as:

- organizational behaviour;
- decision-making;
- success measurement;
- future objectives;
- social responsibility.

To develop this ability, the architect draws on knowledge and information borrowed from:

- the social sciences;
- management sciences;
- operations research;
- industrial engineering.

In addition to architectural ability, the architect may require such skills as management consulting and development economics to undertake functional programs. And along with research expertise, the architect needs good interpersonal and facilitating skills.

The architect often uses the following techniques:

- research;
- observation (of the client's existing site or workplace);
- interviews and direct consultation with end users of the facility;
- public consultation;

- facilitation of focus groups;
- questionnaires and surveys.

Sometimes, stakeholders in a future building project may have conflicting viewpoints. In these cases, the architect must clarify the underlying issues and then find the best solution incorporating common interests and synergies amongst the differing groups. Typical sources of conflict include:

- competing needs may exist within the client organization (for example, end users — such as tenants, teachers or medical staff — may have very different priorities and needs compared to those of landlords, school boards or regional health authorities);
- the involvement of more than one organization;
- different members within the organization may have different visions for the project.

Data management ties together all the information in a functional program. The architect or the programmer must know how to systematically store and retrieve an enormous amount of detailed information. The architect must also present this data to the client clearly so as to enable the client to make effective decisions.

Quantitative Factors

One purpose of most functional programs is to determine the optimum size of a building.

Illustration 2: Unit Space Data

Activity

This area will serve as a utilitarian storage of records from all administrative departments, including all documents which will be archived and not frequently used. This area may be located below grade.

Description of Furnishings and Special Requirements

Note 1. This area requires extensive shelving for non-standard documents and materials, work tables, a reference desk and card catalogues, and 200m of lateral filing cabinets.

Note 2. Environment shall have Temperature set point:
Summer 20 deg C
Winter 20 deg C
Relative Humidity set point:
Summer 50% RH
Winter 50% RH
max. fluctuation ± 3%

Note 3. Floor construction must support adequate loads imposed by lateral filing cabinets.

Room Name: Central Storage Records

Floor Area	430 m^2	
Critical Dimensions	Ceiling height: Length: Width:	4 m — —
Access	Freight and public elevator	
Daylight	No daylight required or desired	
Users	Staff Visitors Others	Yes No No
Time in Use	Office hours Other hours Special	Yes Yes Yes
Furnishings		Note 1
Security	Basic level of protection	
Finishes	durable resilient flooring/ painted gypsum board/ accessible acoustic tile	
Electrical	110v AC utility outlets	
Lighting	General level Task level UV screened	Yes Yes No
HVAC Sytems		Note 2
Plumbing		not required
Fire Suppression	Standard requirements	
Communications	Telephone, data, and intercom	
Floor Loading		Note 3

The amount of space required is ascertained from first principles of architectural design, such as:

- the number of people or pieces of equipment that will occupy the spaces;
- the nature of the activity in the space.

Architects need to be familiar with current reference material and standards which relate human activities or technical processes to the amount of space required to support them. The best standards are developed from large amounts of data.

Refer to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*, for a discussion of standards.

In pre-design work, an understanding of net and gross floor areas is essential for determining the probable size of a building. Architects working for the commercial sector need to be familiar with the floor area measurements used for leasing purposes. The Building Owners and Managers Association (BOMA) publishes the *Standard Method for Measuring Floor Areas in Office Buildings*, a standard known as ANSI/ BOMA Z65.1-1996. Other agencies at the federal and provincial level publish floor area standards for other building types.

Site Evaluation and Analysis

Site evaluation is a pre-design service. It includes evaluation of existing or potential sites in relation to the building program, budget, and construction schedule. Normally one site is then recommended.

Site analysis of a single site in the pre-design phase is usually a separate service. In certain circumstances, site analysis may be undertaken as part of the schematic design phase of a project and the fee should be adjusted accordingly.

Data Collection

To analyze the site, the architect requires the following information:

- existing conditions which have an impact on the design:
  - climate, including prevailing winds, solar orientation, etc.;
  - topography, including site contours, drainage, water courses, visual characteristics, physical features, vegetation, water bodies, etc.;
  - geotechnical or soil information;
  - environmental hazards;
  - immediate surroundings, including neighbouring structures, shading and solar access, noise, views, and vistas;
- property description:
  - legal description, including boundary survey, easements, rights-of-way, etc.;
  - vehicular and pedestrian access;
  - utilities and services available to the site.

Zoning and Other Regulations

It is important to identify the zoning or land use regulations which apply to the site, including:

- permitted uses;
- minimum area;
- height restrictions;
- setbacks;
- lot coverage:
  - floor area ratio;
  - percentage of coverage;
- open space requirements;
- parking requirements;
- other requirements.

The architect also needs to determine what other regulatory requirements apply to the site and the respective Authority Having Jurisdiction. Refer also to Chapter 1.2.4, *Building Regulations and Authorities Having Jurisdiction*.

After site analysis has been completed, it may be necessary to prepare presentation material to assist in the formal procedures for applications to the Authorities Having Jurisdiction. The architect may also be expected to make presentations to municipal committees or at public meetings during the pre-design stage of a project.

Refer to "Site Evaluation Checklist" at the end of this chapter for a complete list of factors to consider when evaluating a site.

Master Planning

Master plans define long-term development strategies for specific sites, campuses or communities, including considerations related to current and future infrastructure, site development, site circulation, and spatial relationships. A master plan, may be required following completion of a functional program and establishes the process for the program's staged implementation over time.

Organizational Planning

Organizational change frequently generates the need for new buildings or alterations to existing buildings. Conversely, executives and managers often use the decision to plan and renovate or construct as a catalyst for organizational or administrative change. The architect is likely to become involved in this process and should have a basic knowledge of the culture of organizations and business administration. Information on organizations and management is available through management training courses and in most libraries.

Financial Planning

Financial issues are usually first addressed at the pre-design phase of a project. Data and information about the proposed building at this stage are general in nature; therefore, cost planning will likewise be very general. The programmer must be familiar with the cost information available for early financial planning, for example:

- hospitals use unit-of-service measures to identify "ballpark" costs of proposed development, such as:
  - cost, expressed in $ per bed;
  - the number of beds determined by populations in the hospital catchment area;
- some educational institutions use formulae based on the number of full-time-equivalent students to determine:
  - the amount of space at an early stage;
  - the capital cost of projects;
- developers have rules of thumb for determining the likely capital costs of housing, office buildings or shopping centres.

Financial plans are typically presented as a "pro forma" which may include:

- hard development costs (construction and land costs);
- soft development costs (such as professional fees, realtor fees);
- financing costs;
- market revenue analysis;
- escalation;
- rates of return on investment.

The completed financial plan should identify "how much building must be built" (scope of the project) and should establish a preliminary financial analysis indicating capital costs on a unit area basis. One purpose of a financial plan is to provide information used to prepare a project budget and construction budget. Refer also to Chapter 2.3.3, *Cost Planning and Control*.

Definitions

Business Case: A document developed to establish the merits and desirability of the project and justification for further project definition and the commitment of resources. Information included in a business case includes the background of the project, the expected business benefits, the options considered (with reasons for rejecting or carrying forward each option), the expected costs of the project, a gap analysis or the variance between business requirements and current capabilities, and the expected risks. Consideration should also be given to the option of doing nothing including the costs and risks of inactivity.

Feasibility Study: A report which outlines the research and subsequent analysis to determine the viability and practicability of a project. A feasibility study analyzes economic, financial, market, regulatory, and technical issues.

Functional Program: A written statement which describes various criteria and data for a building project, including design objectives, site requirements and constraints, spatial requirements and relationships, building systems and equipment, and future expandibility.

Pre-design Services: The architectural services provided prior to the schematic design phase which assist the client in establishing a functional program as well as the project scope, including a financial and scheduling plan.

References

Brauer, R.L. *Facilities Planning*. New York, NY: Amacon, 1992.

France, Kenneth and Michelle Kish.

Helping Skills for Human Service Workers: Building Relationships and Encouraging Productive Change. Charles C. Thomas, 2005.

Supportive Interviewing in Human Service Organizations. Springfield, IL: Charles C. Thomas, 1995.

Hershberger, Robert. *Architectural Programming and Predesign Manager*. New York, NY: The McGraw-Hill Companies, 1999.

Palmer, Mickey A. *The Architect's Guide to Facility Programming*. New York, NY: The American Institute of Architects and Architectural Record Books, 1981.

Peña, William M; Steven A. Parshall; and Kevin A. Kelly. *Problem Seeking: An Architectural Programming Primer*. John Wiley & Sons. 2001

R.S. Means Co., Inc. *Yardsticks for Costing*. Published annually. Canadian Construction Cost Data. Published annually. R.S. Means Co., Inc.

Appendix A - Green Building Rating Systems

Introduction

Designing, constructing and operating environmentally friendly buildings can be complex, especially when it comes to materials selection. All architects would like simple measures or rules of thumb that would make the selection process easy, but such simple measure do not exist. The reality is that designers and specifiers are constantly forced into a balancing act, trading off a good effect here with a not-so-desirable outcome there. Fortunately, there are a variety tools that can help. This Appendix presents a simple system for classifying sustainable, or 'green', building tools and describes how these tools interrelate, and where they fit in the green design process.

A Tool Classification System

This simple tool classification system helps organize the most commonly used green building tools in terms of their purpose and application in various phases of project delivery. The system suggests three main levels of tools, labeled simply as Level 1, 2, and 3 tools.

Level 1 tools focus on individual products or simple assemblies (such as floor coverings or window assemblies) and are used to make comparisons in terms of environmental and/or economic criteria. Level 1 tools are probably the most common tools. *BEES* and *GreenSpec Directory* are especially relevant for architects:

- *BEES* is a Life Cycle Assessment (LCA) based software tool developed by the U.S. National Institute of Standards and Technology, and is designed to make product-to-product comparisons based on LCA and Life Cycle Costing (LCC) data. It uses a weighting system to combine disparate environmental measures into one score that can be charted against cost. (*www.bfrl.nist.gov/oae/software/bees.html*)

- *GreenSpec Directory* is a guide to "green" building products developed by Building Green (the publishers of Environmental Building News), and through an online web site subscription. The Directory provides detailed product listings for more than 1,800 products in 250 categories, organized according to the CSI *MasterFormat™* system, and helps users understand the environmental merits of individual products based on a set of criteria developed by the publishers. GreenSpec also provides guideline specifications for each product category, indicating the benefits, drawbacks, environmental considerations, and generally what to look for in a green product within a given category. *www.BuildingGreen.com*

Labeling systems like the Environmental Choice program, operated by Terra Choice, and various forest certification systems are also Level 1 tools. The caution is that many labeling programs focus on single attributes, or performance measures (such as energy use or recycled content, for example), and therefore it may be misleading when they convey a 'green' label. The product in question may indeed be excellent in terms of the criteria selected for the evaluation, but that does not necessarily mean it would score well in a full Life Cycle Assessment, or in a system that takes more attributes into account. *www.EnvironmentalChoice.com*

Level 2 tools focus on the entire building, or complete assemblies, providing support for decision-making in specific areas of concern such as life cycle costs, operating energy, or life cycle environmental effects. Theses tools are data-oriented and objective, and can be applied from the pre-design through to detailed design and construction documentation stages of a project. Operating energy simulators (e.g., EE4 and Hot2000), day-lighting analysis tools such as Radiance, and the RETscreen renewable energy feasibility tool are in this category along with life cycle costing.

www.radsite.lbl.gov/radiance/HOME.html
www.retscreen.net

Athena's Environmental Impact Estimator is particularly relevant here because it is the only Level 2 tool in North America that assists with material selection in the context of life cycle assessment of an entire building. Rather than dealing with individual products, it focuses on the entire building or complete building assemblies and therefore captures the implications of such a system comprised of several products within a building's structure and envelope. *www.athenaSMI.ca*

The Estimator and *BEES* are complementary, with the Estimator more appropriately used at the conceptual and schematic design stage, and *BEES* during design development and construction documentation stages.

Level 3 tools are whole building assessment frameworks or systems that encompass a broader range of environmental, economic and social concerns or sustainability issues. Level 3 tools use a mix of objective and subjective inputs, leaning on Level 2 tools for much of the objective data — energy simulation results, for example. All use subjective scoring or weighting systems to distill the information and provide overall measures, and all can be used to inform or guide the design process.

LEED™ and Green Globes, a derivative of BREEAM Green Leaf, are currently the best-known Level 3 tools in Canada. These Level 3 tools may be used for new projects, existing buildings, and for major renovations or retrofits. Some of these tools require external auditors, and most yield certificates or labels indicating a building's performance. They can be used for a wide range of building types, from residential to commercial, institutional and light industrial.
www.cagbc.ca and *www2.energyefficiency.org*

Other Tools, Systems and Sources

The tools mentioned above are only representative and certainly do not exhaust the list for each category. For example, there are other sources of information on products, and there are excellent web sites that provide design guidance as well as specific technical information. There are also other whole building assessment systems used in the U. S. and elsewhere.

It is important to understand clearly their important distinctions. Does a tool work at the level of whole buildings or is it focused more on individual products or components? Does it deal with a specific topic or concern, such as energy use, or does it cover a broad spectrum of sustainability issues? Is the tool quantitative or does it include subjective or qualitative elements? Too often these distinctions are ignored and comparisons are made between tools that are intended for entirely different purposes. For example, *BEES* and the Athena EIE are complementary tools, intended to meet different needs at different stages of the project. They are not competitive tools requiring a choice of one over the other.

Other resources:
www.iiSBE.org
www.wbdg.org

Life Cycle Assessment (LCA)

LCA is a methodology for assessing the environmental performance of a product over its full life cycle, often referred to as cradle-to-grave or cradle-to-cradle analysis. Environmental performance is generally measured in terms of a wide range of potential effects, such as fossil fuel depletion, global warming, or ozone depletion. All are measures of indicators of the environmental loadings that can result from the manufacture, use and disposal of a product. The indicators do not directly address the ultimate human or ecosystem health effects — a much more difficult and uncertain task — but they do provide good measures of environmental performance, given that reducing any of these effects is a step in the right direction.

In LCA, the effects associated with making, transporting, using, and disposing of products are referred to as '*embodied effects*', where the word "*embodied*" refers to attribution or allocation in an accounting sense as opposed to true physical embodiment. In the design and construction sector, the tendency is to refer primarily to 'embodied energy', but all of the extractions from and releases to nature are embodied effects, and there are also embodied effects associated with the production and transportation of energy itself (known as pre-combustion effects).

Although the energy required to operate a building over its life greatly overshadows the energy attributed to the products used in its construction, other embodied effects such as toxic releases to water, are almost entirely a function of resource extraction, manufacturing and transportation activities. The point is to beware of the common tendency to focus only on embodied energy. The essence of LCA is to cast the net wide and capture all of the relevant effects associated with a product or process over its full life cycle, including the production and use of other products required for operations, cleaning or maintenance.

LCA is not the same as life cycle costing (LCC). The two methodologies are complementary, but LCC focuses on the dollar costs of constructing, operating and maintaining a structure over its life cycle, whereas LCA focuses on environmental performance. Performance is measured in the units appropriate to each emission type or effect category. For example, global warming gases are characterized in terms of their heat trapping effects compared to the effects of CO2, and global warming potential is measured in equivalent tonnes of CO2.

Site Evaluation Checklist

This is a checklist of the factors that may be involved in evaluating a site. Although lengthy, this list is not all-inclusive; new factors are added from time to time. Information is usually collected only for those items that are pertinent to the project.

PHYSICAL FACTORS

Climate

A. Prevailing winds
   1. Direction
   2. Maximum, minimum, and average velocities
   3. Special forces (e.g., tornadoes, hurricanes)

B. Solar orientation
   1. Sun angles
   2. Days of sunlight
   3. Cloud cover
   4. Shading of (or from) adjacent structures, natural features, and vegetation

C. Temperature
   1. Ranges of variation
   2. Maximums and minimums

D. Humidity
   1. Ranges of variation
   2. Maximums and minimums

E. Precipitation
   1. Peak period totals
   2. Annual and seasonal totals

Topography

A. Legal property description, including limits of property, easement, rights of way, and north indication

B. Topography maps and aerial photos
   1. Contours and spot elevations
   2. Slopes: percentage, aspect, orientation
   3. Escarpment
   4. Erosion channels
   5. Extent, location, and general configuration of rocks, ledges, outcrops, ridges, drainage lines, and other unique features
   6. Visual characteristics
   7. Potential problem areas during construction: siltation, erosion, etc.

C. Analysis of physical features, including major focal and vantage points and their relationships within, into, and out from the site

D. Existing access and circulation
   1. Vehicular
   2. Pedestrian

E. Vegetation

F. Existing water bodies
   1. Location, size, depth, direction of flow
   2. Water quality: clean, polluted, anaerobic conditions, etc.
   3. Use: seasonal, year-round
   4. Wetlands: ecological features
   5. Variations: expected water levels, tides, wave action
   6. Coastal features

G. Drainage canals: rivers, streams, marshes, lakes, ponds, etc.
   1. Natural and built
   2. Alignments and gradients
   3. Pattern and direction

H. Existing waterway easements
   1. Surface
   2. Sub-surface

I. Surface drainage
   1. Patterns on and off the site (location of streams and washes)
   2. Proximity to floodplains
      a. Maximum flood level
      b. Frequently flooded areas
   3. Local watershed areas, amount of runoff collected, and location of outfalls
   4. Swampy and concave areas of land without positive drainage and other obstacles that may interrupt or obstruct natural surface drainage
   5. Potential areas for impoundments, detention/retention ponds

J. Unique site features

Geotechnical/Soils

A. Basic surface soil type: sand, clay, silt, rock, shale, gravel, loam, limestone, etc.

B. Rock and soil type: character/formation and origin
   1. Geologic formation process and parent material
   2. Inclination
   3. Bearing capacity

C. Bedrock
   1. Depth to bedrock
   2. Bedrock classification

D. Seismic conditions

E. Environmental hazards

Utilities

A. Potable water
B. Electricity
C. Gas
D. Telephone
E. Cable television
F. Sanitary sewer service
G. Storm drainage (surface, sub-surface)
H. Fire protection

Immediate Surroundings

A. Neighbourhood structures: buildings, satellite dishes, etc.
B. Shading and solar access
C. Noise from streets, emergency services, aircraft, etc.
D. Odours
E. Views and vistas

General Services

A. Fire and police protection
B. Trash/refuse removal services
C. Snow removal, including on-site storage

CULTURAL FACTORS

Site History

A. Former site uses
   1. Hazardous dumping
   2. Landfill
   3. Old foundations
   4. Archaeological grounds

B. History of existing structures
   1. Historic worth
   2. Affiliations
   3. Outline
   4. Location
   5. Floor elevations
   6. Type
   7. Condition
   8. Use or service

Land Use, Ownership, and Control

A. Present zoning of site and adjacent property

B. Adjacent (surrounding) land uses
   1. Present
   2. Projected
   3. Probable effects on the development of this site

C. Type of land ownership

D. Function and pattern of land use: public domain, farm type, grazing, urbanized
   1. Present
   2. Former

E. Location, type, and size of pertinent community services
   1. Schools and churches
   2. Shopping centres
   3. Parks
   4. Municipal services
   5. Recreational facilities
   6. Bank
   7. Food services
   8. Health services
   9. Access to highways, public transportation

Economic Value

A. Political jurisdictions and land costs

B. Accepted "territories"

C. Future potential

D. Size of surrounding lots and approximate price ranges

REGULATORY FACTORS

Zoning Codes

A. Permitted Uses
   1. By variance
   2. By special use permits
   3. Accessory structures

B. Minimum site area requirements

C. Building height limits

D. Yard (setback) requirements

E. Lot coverage
   1. Floor area ratio (FAR)
   2. Percentage of coverage
   3. Open space requirements

F. Off-street parking requirements

G. Landscaping requirements

H. Sign requirements

Sub-division, Site Plan Review, and Other Local Requirements

A. Lot requirement
   1. Size
   2. Configuration
   3. Setbacks and coverage

B. Street requirements
   1. Widths
   2. Geometry: grades, curves
   3. Curbs and curb cuts
   4. Road construction standards
   5. Placement of utilities
   6. Dead-end streets
   7. Intersection geometry
   8. Sidewalks
   9. Names

C. Drainage requirements
   1. Removal of spring and surface water
   2. Stream courses
   3. Land subject to flooding
   4. Detention/retention ponds

D. Parks
   1. Open space requirements
   2. Park and playground requirements
   3. Screening from adjacent uses

Environmental Regulations

A. Water, sewer, recycling, solid waste disposal

B. Clean air requirements

C. Soil conservation

D. Protected areas, wetlands, floodplains, coastal zones, wild and scenic areas

E. Fish and wildlife protection

F. Protection of archaeological resources

Other Codes and Requirements

A. Historic preservation and landmarks

B. Architectural (design) controls

C. Special districts

D. Miscellaneous, e.g., mobile homes, billboards, noise

E. Site-related items in building codes
   1. Building separation
   2. Parking and access for persons with disabilities
   3. Service and emergency vehicle access and parking

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Checklists for an Integrated Design Process for Retrofitting Buildings

Step 1: **Needs Assessment**

a) Assemble the Design Team
   - include engineers experienced and interested in energy efficient buildings and energy simulations (consider defining the energy performance expectations for the consultants and clearly articulate these requirements contractually in an architect/consultant agreement)
   - include a lighting designer or a daylighting specialist
   - consider a third party commissioning consultant depending on the size and complexity of project
   - include the building maintenance personnel responsible for the building(s)

b) Confirm client and user objectives

c) Establish long-term financial goals (such as 10 year combined operating + capital target)

d) Establish performance targets and strategies to meet client and user objectives

e) Identify and address contradictions between objectives, financial goals and performance targets

f) Develop or assess functional program (including objectives, performance targets and financial goals)
   - see *Functional Program Checklist*

Step 2: **Existing Building Assessment**

a) Conduct an Audit of the Existing Building (This audit should be conducted with all the relevant consultants on the site simultaneously. The architect should take the lead and ensure that all aspects of the building systems are reviewed. Visual review should be thorough, invasive review in selected areas should also be completed if appropriate.)
   - Client to provide Base Drawings for Architectural, Mechanical, Electrical and Structural systems if existing
   - Client to provide Energy Data for previous year of use: fuel, electrical, water (utility bills, etc.)
   - see *Building Audit Checklist*

b) Hold a Design Workshop
   - see *Design Workshop Checklist*

Step 3: **Proposed Building Retrofit Plans**

a) Develop Concept Design
   - see *Performance Design Concepts Checklist*

b) Develop Preliminary Lighting and Power System Upgrades
   - see *Upgrades to Existing Lighting and Power Systems*

c) Develop Preliminary Heating, Cooling and Ventilation System Upgrades
   - see *Upgrades to Existing HVAC System*

d) Select Finish Materials and Systems
   - see *Materials Selection Checklist*

Step 4: **Assessing Alternatives and Interactions**

a) Compare individual system designs to project objectives and goals

b) Assess whole building performance

c) Revise designs and re-assess

d) Compare to 10 year operating + capital targets

Step 5: **Final Retrofit Plan**

a) Complete Site and Building Design and Documentation
   - see *Design and Documentation Checklist*

b) Develop Quality Assurance Strategies for Construction
   - see *Construction Quality Assurance Strategies Checklist*

c) Develop Quality Assurance Strategies for Operation
   - see Operation Quality Assurance Strategies Checklist

Step 6: **Performance Assurance & Monitoring**

a) Owner / Operator to provide reports on operations, maintenance, & utility bills

b) Analyze building performance, compare to performance targets Performance failure troubleshooting

Checklist For Retrofitting Buildings

1: Functional Program Checklist

- ❑ Determine if the proposed space requirements can be satisfied by re-organisation instead of renovation
- ❑ Develop facility functional program to respond to building structural grid to reduce extent of demolition in the proposed renovation. Assess the capacity of the functional program to support mixed uses
- ❑ Verify expected occupancy schedules and determine the extent to which they are subject to change over time. (Buildings with a high percentage of off-hours operations, with the building only partially occupied will benefit from highly flexible HVAC systems)
- ❑ Determine an acceptable comfort range based on the building occupancy and facility functional program. (Dehumidication and humidification strategies can be very energy intensive)
- ❑ Review the functional program requirements and determine the relative complexity of building performance needed. A building utilized 24 hours per day 7 days per week (24/7) has obviously different implications to a building utilized 10/5
- ❑ Review plug load assumptions. (Plug loads are often overestimated: verify usage of equipment not just electrical capacity as noted on the equipment)
- ❑ Determine lighting levels for all programmed areas. Consider reducing general ambient lighting levels and utilizing task ambient lighting to achieve minimum acceptable levels
- ❑ Review budget and pay-back requirements for compatibility with performance goals
- ❑ Prepare a Functional Program and Performance Goals Report

2: Building Audit Checklist

- ❑ **Structural Review**
  Outline structural system, load capacity, grid horizontal and vertical dimensions Indicate thermal mass properties (if any) Outline current code requirements for the structural system, potential upgrades required Outline generic building horizontal and vertical modules based on the structural grid Review: Does the design of this system complement or compromise any other system?
- ❑ **Building Enclosure Review**
  Review and document existing site conditions Document the type, condition and thermal properties of building enclosure systems: floors, walls, windows, roofs Document the type and condition of building vertical circulation systems Document the current envelope and an estimated future replacement schedule Document the current building code requirements and upgrades required (if any) Review existing building exterior finishes for type, condition and replacement schedule
- ❑ **Mechanical Review**
- ❑ **Lighting Review**
- ❑ **Review of Interior Finishes and Equipment**
- ❑ **Building Energy Audit**
- ❑ **Code Review**

3: Design Workshop Checklist

- ❑ Indicate energy benchmarks for existing building based on building typology and age of construction
- ❑ Determine the largest energy cost component of the existing building (lighting, cooling, heating, ventilation) from building historical data on energy use
- ❑ Develop a reference schematic design for the building that fulfills minimum code, functional, market and reference requirements
- ❑ Undertake an energy simulation and cost analysis of the reference design
- ❑ Hold a one or two day Design Workshop with the Design Team and invited experts to review the Reference Design and to discuss performance design concepts.
- ❑ Establish performance goals, targets and strategies, include:
  - Energy usage
  - Water Usage
  - Return on Investment (ROI) timelines
  - Mechanical / Natural Ventilation Strategies
- ❑ Outline potential enclosure enhancements appropriate for climate zone
- ❑ Set preliminary targets for envelope performance
- ❑ Decide on at least one design option for further development
- ❑ After the Design Workshop, undertake energy simulations and cost analysis of high performance option(s) and revise performance targets and strategies if necessary and add new talent to the design team as required
- ❑ Prepare a Design Workshop Report.

4: Performance Design Concept Checklist

SITE DATA

In a retrofit project, the building site, form and orientation are existing conditions to consider and exploit. Some site features can ultimately affect the building energy usage and occupancy comfort levels as well as contribute towards improved indoor air quality.

- ❑ Does the existing building orientation have the potential to facilitate passive solar energy collection and storage?
- ❑ Collect information on local temperature means and extremes. (A diurnal temperature swing of 6-7 degrees C (20 degrees F) indicates that thermal mass storage or night ventilation could be an effective strategy)
- ❑ Collect information on available solar radiation
- ❑ Collect information on humidity. (Based on stated design criteria, an estimate of the number of days that would require humidification / dehumidication can be calculated)
- ❑ Collect information on prevailing wind direction and velocities. (Wind patterns inform the development of natural ventilation strategies)
- ❑ Are there renewable resources available for use in the building retrofit? (wind, solar, geothermal)
- ❑ Determine if there are any local utility, municipal, provincial or federal rebates and/or incentives for the integration of passive or active renewable resources or improved energy efficiency.

SITE ANALYSIS

- ❑ Consider the impact of topography. (If the building to be retrofit is located in an area with hills and valleys, slope and aspect, this topography can contribute to energy performance by draining cool air at night, contributing to lower temperatures)
- ❑ Consider the impact of vegetation. Increasing vegetation/trees around buildings can reduce exposure to sunlight (This can reduce temperatures by as much as 9 degrees C (15 degrees F))
- ❑ Develop landscape plans to provide windbreaks, shading, and minimize water demand
- ❑ Consider the extent to which the ground can act as a heat sink, based on the elevation of the water table relative to the frost line, and soil structure
- ❑ Review site context to determine if there established neighbourhood ecological patterns that could be enhanced, such as water treatment and drainage patterns, green spaces, pedestrian and transportation networks
- ❑ Review location and current codes to determine if the building will require a seismic upgrade
- ❑ If the functional program or retrofit results in an increased demand for parking, review opportunities for utilizing adjacent areas in lieu of increasing on site parking
- ❑ Consider measures to minimize construction damage to surface ecology.
- ❑ Consider measures to minimize impacts on subsurface ecology and aquifers.
- ❑ Summarize site development issues in a Draft Site Impact Plan

BUILDING RETROFIT CONCEPTS

- ❑ Develop concept plan to optimize functionality and minimize area and volume
- ❑ Organize configuration and floor plate depth to balance daylighting and thermal performance. If there is a large floorplate, can effective daylighting and ventilation strategies be created through the addition of new openings, an atrium, or skylights
- ❑ List of all the opportunities to reduce energy usage in the building
- ❑ If perimeter heating is utilized, is it either desirable or possible to enhance the building enclosure thermal properties (walls and windows) to eliminate the need for the perimeter heating?
- ❑ Consider ways to integrate the potential for future photovoltaic as an energy source into the redesign of the building electrical system
- ❑ Explore feasibility of mixed mode or elimination of mechanical ventilation and replacing it with natural ventilation if the functional program, form, and location permit
- ❑ If appropriate, consider utilizing an underfloor access distribution for considerable energy savings
- ❑ Consider using the structure as a finish material
- ❑ Does the existing building structure and building form allow for a green roof?
- ❑ Review the floor-to-floor height for flexibility to accommodate future uses
- ❑ Consider replacing fenestration on each building facade if the "Return on Investment" (ROI) warrants this approach to optimize solar heating/ cooling, daylighting benefits
- ❑ Optimize the daylighting and thermal performance of fenestration. Minimize locating fixed partitions along the perimeter that will affect daylight penetration into interior spaces
- ❑ Consider integrating exterior solar controls and interior light shelves into the retrofit concept if appropriate
- ❑ Optimize the envelope thermal performance using performance simulations
- ❑ Review: Does the design of this system complement or compromise any other system?
- ❑ Evaluate all energy and water saving systems as a team. Carry out whole building energy simulations
- ❑ Prepare the Concept Design Report.

5: Structural Design Checklist

- ❑ Identify structural load capacity to determine any restrictions in use
- ❑ Consider thermal storage options using structure
- ❑ Consider adequacy of column spacing and core position for future uses
- ❑ Consider floor to floors heights for ability to respond to changing HVAC delivery and cabling requirements
- ❑ Review: Does the structural system complement or compromise other building systems?

6: Enclosure Design Checklist

- ❑ Identify specific performance objectives
- ❑ Set preliminary targets for envelope performance
- ❑ Optimize daylighting and thermal performance of fenestration
- ❑ Optimize the envelope thermal performance using performance simulations
- ❑ Review: Does the design of this system complement or compromise any other system?

7: Upgrades to Existing Lighting and Power Systems

- ❑ Identify specific performance objectives
- ❑ Evaluate existing lighting design
- ❑ Develop preliminary lighting system design for retrofit
  - a. If existing design meets new needs:
    - i. Replace all incandescent with compact fluorescents(MR16 halogens currently have no drop-in replacements)
    - ii. Re-lamp and re-ballast to T8 and electronic ballasts. (Replacing fixtures will achieve best performance if moving from a T12 lamp to a T8)
  - b. If new lighting design required (note simply re-lamping and re-ballasting will increase overall light output, higher energy savings can be achieved by redesigning lighting to meet appropriate lighting level):
    - i. Avoid halogen lamps (MR16s) for general lighting (where used for accent lighting look for alternatives)
    - ii. Use Indirect/direct lighting fixtures that complement daylight and that can achieve lowest energy consumption
    - iii. Evaluate high output T5 and T8 fluorescent fixtures (instant on, dimming capable, longer lamp life) in lieu of metal halide fixture
- ❑ Develop preliminary lighting control system
  - a. Evaluate occupancy controls
  - b. Evaluate daylighting control scheme, to reduce annual lighting energy consumption. Consider window placement and room layouts, review to optimize
- ❑ Estimate the power requirements for future tenant equipment
- ❑ Optimize the energy efficiency of vertical transportation systems
  - a. Evaluate occupancy controlled escalators (cost effective) and high efficiency elevators (potential innovation LEED point)
- ❑ Develop strategies to shave peak demand
- ❑ Summarize lighting issues for Comfort and Productivity Performance Plan
- ❑ Review: Does the design of this system complement or compromise any other system?

8: Upgrades to Existing HVAC System

- ❑ Identify specific performance objectives
- ❑ Evaluate existing systems, are they due for replacement?
- ❑ Evaluate current ventilation for new building use
- ❑ Define load on HVAC for new building use
  - a. Envelope, (windows, walls, roof, etc. - include thermal bridging effects), interior gains (lighting, plug loads) and ventilation
  - b. Consider any changes in space and layout and their subsequent impact on HVAC system zoning
  - c. If relevant to future HVAC operation, measure current loads to determine sizing and design parameters
- ❑ Complete energy simulations assessing whole building design performance. (Use an energy simulation model for all following evaluations of energy efficiency measures)
- ❑ Consider thermal storage options using mechanical systems
- ❑ Develop preliminary design for ventilation, heating, and cooling delivery systems
  - a. Evaluate current system's ability to meet loads efficiently
    - i. If HVAC requires more capacity, evaluate relative costs and benefits of envelope upgrades and measures to reduce loads or to increase HVAC capacity
    - ii. If current system is constant air volume (CAV) system (dual or single duct), consider conversion to variable air volume (VAV), evaluate impact on ventilation
    - iii. If current system is single-zone rooftops, evaluate high performance rooftops for additional capacity
  - b. If completely new HVAC system, evaluate different systems for energy efficiency, indoor environmental quality (IEQ), and integration with building. Consider:
    - i. 100% fresh air systems with distributed heating and cooling (e.g. heat pumps, local heating/cooling coils, radiant heating/cooling) offer excellent energy saving opportunities, excellent ventilation and indoor air quality (IAQ), low noise and minimal HVAC service space requirements
    - ii. VAV systems offer good energy saving opportunities, average ventilation effectiveness (careful design required). Always include air side economizer

iii. CAV systems can, in some circumstances, (system primarily serves internal spaces with year round constant cooling requirements) be energy efficient, offer good ventilation, simpler design and controls. Always include air side economizer

[Note: these descriptions should also be a part of evaluation of current HVAC system]

c. If single-zone rooftops, replace poorly performing units.
   i. If additional/replacement units required evaluate high efficiency (CEE Tier 2) units. At minimum include heat recovery, free cooling economizer, and modulating/condensing burners

- ❑ Develop preliminary ventilation, heating and cooling control systems
  a. Ensure opportunities for free-cooling are maximized
  b. Schedule "turn off" of equipment when not needed
  c. Minimize simultaneous heating and cooling operation
  d. Use outdoor-reset strategies to increase part-load efficiencies, and match system output to current weather conditions
- ❑ Develop preliminary design for heating central plant
  a. If retaining existing boiler, consider burner replacement to increase efficiency. (Variable output burners can increase part load efficiency)
  b. If replacing boiler, evaluate condensing boilers. This requires low temperature return water, using larger heat delivery devices (e.g. fan coils, larger baseboard radiators, larger radiant panels, or in-floor heating). If cost constrained, evaluate multiple boilers with only the lead boiler being condensing
  c. If replacing boiler, specify, at a minimum, a high-efficiency or near-condensing boiler
  d. Specify new boiler(s) to address part load efficiency operation
     i. Use multiple boilers
     ii. Staged or variable output boilers
  e. Use higher temperature drop heat distribution devices to reduce return water temperature (see comment above on condensing) to lower pumping power and increase efficiency of all boilers
  f. Evaluate variable speed drive (VSD) hot water loop pump
     i. In conjunction with VSD, evaluate 2-way valves at coils, radiators etc., to decrease return water temperature during part load operation
- ❑ Develop preliminary design for cooling central plant
  a. Evaluate existing system refrigerant. (CFCs, phased out by Montreal protocol, should be retrofitted to HFCs (best) or HCFCs systems.) If major retrofit required to accomplish this, evaluate in conjunction with high efficiency retrofit options
  b. If replacing chiller, generally air cooled is more cost effective (using life cycle) below 200 tons; water cooled above 200 tons
  c. Always include/retrofit cooling tower economizer for free-cooling with new or existing water cooled chiller
  d. Include variable speed fan drive on cooling tower for new water cooled chiller; for existing, evaluate retrofitting same
  e. Specify new chiller to address part load efficiency operation
     i. Use multiple chillers
     ii. Stages or variable output chillers
  f. For new chillers evaluate zero ozone depletion options (Montreal protocol began phase-out of HCFC in 2005, more HFC options are available everyday)
  g. For new chillers evaluate high efficiency options
  h. Evaluate low energy cooling options (natural ventilation/cooling, evaporative cooling)
- ❑ Heat Recovery
  a. Exhaust air heat recovery almost always cost effective and can be single largest energy saving measure
  b. Evaluate potential for heat recovery off chiller condenser
- ❑ Summarize HVAC issues for Comfort and Productivity Performance Plan
- ❑ Prepare the Design Development Report.
- ❑ Review: Does the design of this system complement or compromise any other system?

9: Materials Selection Checklist

- ❑ Identify specific performance objectives
- ❑ Minimize use of materials or components that rely on scarce material resources
- ❑ Select materials that balance durability and low embodied energy
- ❑ Consider re-use of components, and salvaged, reclaimed, and/or recycled materials
- ❑ Consider use of tiles or modular products rather than sheet goods to minimize extent of replacement of worn or stained areas in the future
- ❑ Design assemblies and their connections to facilitate future demountability and deconstruction
- ❑ Select indoor finishing materials to minimize volatile organic compounds (VOC) and other emissions. Consider in particular the following major items:
  - Caulking
  - Sealants
  - Mortar and Joint compounds
  - Fibrous and Rigid Insulations
  - Millwork
  - Plywood, Fibreboards, Chipboard
  - Window Coverings
  - Furnishings (desk, chairs, associated fabrics)
  - Floor coverings, underlayment, undercushion
  - Paints and wall coverings
  - Trim
  - Ceiling tiles

- ❑ Review: Does the design of this system complement or compromise any other system?
- ❑ Note: Almost all materials and product manufacturers produce MSDS (Material Safety Data Sheets) that can be supplied to the architect or consultant upon request. The MSDS sheets can often be found on the manufacturers' website. For improved indoor air quality, common substances to avoid in materials selection include:
  - VOCs
  - Formaldehyde
  - Isophorone
  - Vinyl chloride
  - Methylene chloride
  - 4-phenylcyclohexene (4-PC)
  - Ethylbenzene
  - Styrene
  - Napthalene
  - Benzene
  - Phthalate esters
  - Methyl ethyl ketone
  - Acrolein
  - Methyl isobutyl ketone
  - Acrylonitrile
  - Toluene
  - 1,2-dichlorobenzene
  - Xylenes
  - Acetone
  - 1,1,1-trichloroethane
  - Carbon tetrachloride
  - Trichloroethylene
  - Tetrachloroethate
- ❑ Heavy Metals
  - Lead
  - Mercury
  - Cadmium
  - Chromium
  - Antimony
  - Nickel

(Reference: The above list of substances is taken from the HOK Guidebook to Sustainable Design)

10: Design and Documentation Checklist

- ❑ Complete site development plan to minimize potable water consumption
- ❑ Modify plumbing and sanitary systems to minimize water consumption
- ❑ Complete enclosure details
- ❑ Finalize lighting system design
- ❑ Finalize ventilation, heating, and cooling system designs
- ❑ Confirm that adequate space exists for data and communications systems
- ❑ Select building energy management control systems if needed
- ❑ Review the use of materials to minimize waste
- ❑ Carry out a final set of energy simulations
- ❑ Produce a final Longevity and Adaptability Plan
- ❑ Prepare the final Life Cycle Cost Report
- ❑ Produce the final Occupant Comfort and Productivity Plan.

11: Construction Quality Assurance Strategies Checklist

- ❑ Develop plan to minimize construction and demolition (C&D) wastes during construction.
- ❑ Develop Final Site Impact Management Plan
- ❑ Develop a Final Quality Assurance Plan
- ❑ Develop a Commissioning Plan for all major systems
- ❑ Prepare the Pre-Construction Report.

12: Operation Quality Assurance Strategies Checklist

- ❑ Appoint an owner's Commissioning Agent
- ❑ Develop a Maintenance and Facility Management Plan
- ❑ Develop Final Environmental Impact Management Plan
- ❑ Develop lease instruments that contain incentives for tenants to operate the space efficiently
- ❑ Train building staff to operate equipment efficiently
- ❑ Prepare and submit a Project Completion Report.

Checklist: Information Required on Land Surveys

1. Ground Elevation and Property Lines

- ❑ Dimensions of property lines.
- ❑ Easements and rights-of-way.
- ❑ Angles at intersections of property lines.
- ❑ Contour lines showing variations of _____ mm in ground elevations. (insert amount of change in elevation to be recorded, such as 300mm)
- ❑ Ground elevations on a _____ mm grid. (insert size of grid, such as 7500mm)
- ❑ Contour lines where abrupt changes in topography occur.

2. Surface Items Inside Property Lines

Provide all pertinent information including sizes, material, location, condition, etc. for the following:

- ❑ Poles
- ❑ Sidewalks, paved areas, driveways.
- ❑ Landscaping such as fences, edge of tree line, trees greater than 100mm, sodded area, hedges.
- ❑ Streams, wells.
- ❑ Perimeter or existing buildings fully dimensioned with elevations of the basement and ground floor.

3. Underground Services, Tunnels, Pipe Lines, and Open Ditches.

Provide sizes, location and inverts of the following and indicate if stakeout is required:

- ❑ Underground electric supply lines, telephone, cable tv, water and gas.
- ❑ Sanitary sewers
- ❑ Storm sewers
- ❑ Other pipe lines
- ❑ Tunnels
- ❑ Open ditches, swales.

4. Streets and Sidewalks.

- ❑ Type of material and location of adjacent streets, lanes, sidewalks, and rights of way.
- ❑ Curb lines and locations of curb cut-outs for driveways.
- ❑ Elevation at crown of street, curb.
- ❑ Location of obstructions, clear heights, and location of service or pedestrian doors on service lanes.
- ❑ Distance from property line to centreline of street.
- ❑ Location and elevation at invert and top of manholes, catch basins.
- ❑ Type of material and location of electric, telephone and other utility poles as well as fire hydrants.

5. Adjacent Properties

Indicate if permission must be obtained from abutting property owners

- ❑ Elevations of basement, ground, second floor and roof or parapet of buildings which are immediately adjacent to the site.
- ❑ Provide sufficient spot elevations to indicate surface drainage.
- ❑ Location and identification of party walls on adjoining properties.

Note: This checklist is meant to assist the Architect in providing instructions to a Land Surveyor by identifying the requirements needed when they are engaged to prepare a survey of a particular site. Generally speaking, land surveys shall indicate location and description of any features that would affect construction as well as all easements, alignment restrictions or other special zoning or town planning information, which might determine the location of the building on the property.



2.3 Management of the Project

2.3.5 Schematic Design

Introduction

Client-Architect Relationship

Information Required at Schematic Design

Space, Circulation, and Massing Studies

Engineering Services for Schematic Design – Integrated Design

Design Alternatives: Evaluation and Selection

Building Cost Analysis

Documentation and Presentation

Standard Contract Documents and Checklists

References

Schematic Design

Introduction

Schematic design is the phase of the project during which the client's requirements and desires assume architectural form. The term also represents the important conceptual stage where the architect can provide added value by using creativity and ability to synthesize various, and often competing, requirements. At this stage, the architect and the client agree on an architectural concept representing a synthesis of the following elements:

- the nature of the site;
- the space planning requirements described in the client's program;
- the self-image or philosophical objectives of the client;
- the design approach of the architect.

In schematic design, the architect and the client discuss and confirm the key issues of the project and agree on the architectural form to accommodate them. This form should be based on a design brief or functional program developed during pre-design (refer to Chapter 2.3.4, *Pre-design*). The benefits and value of preparing a well-thought-out program cannot be overstated.

Throughout the schematic design phase, the architect tests the client's program by studying various planning and massing relationships, always within the constraints of the project budget. Ideally, schematic design will conclude with a design which is the best possible synthesis of all the factors being considered.

Schematic designs may be developed using an Integrated Design Approach which involves a multi-disciplinary team of design professionals as well as the client as a core team member. Sometimes a facilitator is involved to assist the team in establishing sustainable goals and in considering the impacts of all design decisions on the life cycle of the building. Inevitably there will need to be trade-offs (such as incorporating high performance windows and thereby reducing the size and cost for mechanical equipment). The sustainable vision for the project should involve documentation of all design decisions. Integration at the schematic design stage of appropriate site development, building envelope characteristics, and mechanical and electrical systems optimizes the contribution of each design discipline.

Also new software developments allow architects to undertake preliminary modeling and develop rapid prototypes as well as document the building as a three-dimensional model using Building Information Modeling or BIM. These new techniques mean that the design work is more "front-end loaded" or more intensive during the schematic design and design development phases and therefore schedules, staff time and invoicing must be adjusted accordingly.

As the design character emerges, the need to change program details may become evident. The schematic design process provides a method for fine-tuning elements of the client's requirements and adjusting spatial relationships before beginning design development.

Schematic design is also the stage when the architect assembles the design team, including sub-consultants who:

- become familiar with the opportunities and challenges presented by the building site;
- investigate different types of construction materials, systems, and contractual methods;
- may obtain detailed site information, including all services such as water, sewer, gas;
- establish the project's technical principles;
- review their proposals with the architect and the client.

Refer also the Site Evaluation Checklist in Chapter 2.3.4, *Pre-design*.

Client-Architect Relationship

The most successful projects result when the client participates actively in the development of the design. Throughout schematic design, the architect-client dialogue continues, as proposals for specific responses to the project's requirements are put forward by the architect. It is important for the parties to remain in agreement over the fundamental issues outlined in the functional program. To facilitate effective client participation and to maintain the trust between the parties, the architect must encourage communication and ensure that all design issues and construction budgets are presented and open to discussion. Minutes of design meetings should be taken and circulated.

Timely client involvement will help resolve difficulties with program elements or highlight the need to modify the program. Budgets must be reviewed to ensure that the proposed solution meets all functional requirements; alternatively, the budget can be adjusted. With a speculative building project, or with alternative construction project delivery systems, the architect may not have access to a community of users. In this instance, the client is considered the user representative. The architect may request that the client formally confirm certain decisions with recognized user groups or associations.

To ensure that projects run smoothly and design time is optimized, the architect should insist that clients provide timely approvals and information on functional requirements.

Information Required at Schematic Design

The client is responsible for providing functional program addressing:

- functional requirements and spatial relationships;
- flexibility and provision for expansion;
- special equipment and systems;
- site requirements;
- construction budget;
- time frame or schedule.

In addition to the program, the client is responsible for providing full documentation of site conditions, including:

- legal and physical surveys;
- reports on sub-surface conditions, including the presence of hazardous materials or other pollutants;
- any other professional reports or opinions from specialist consultants that will have an impact on the work.

If the client does not have all this documentation, the architect may help procure it, acting as the client's agent. Alternatively, the architect may insist that the client retain specialists to provide the necessary information, partly because the architect's liability insurance will not cover certain sub-consultants.

If the architect and the client do not yet have a clearly defined understanding of project objectives, schematic design should be delayed until the appropriate information is available and intentions are understood. Assistance with programming and obtaining missing information are considered additional or optional services and, should be billed accordingly.

As the schematic design process continues, the architect applies technical and regulatory knowledge by:

- incorporating appropriate construction materials and methods;
- ensuring compliance with building codes;
- dealing with occupational health and safety codes;
- ensuring that local zoning and urban design requirements are met.

Before proceeding to design development, architects must fully investigate planning and technical requirements as well as regulations of Authorities Having Jurisdiction (such as environmental impact, site plan control, zoning, parking requirements, and limiting distances). A general overview, rather than a detailed analysis, of building code compliance is necessary at this stage.

Space, Circulation, and Massing Studies

As part of the preliminary analysis of a new commission, the architect will often prepare a series of space diagrams to identify the comparative size and relationships of the functional areas and spaces required. Proportions and volumes can be established and, with the data rationalized to this extent, the preliminary architectural planning and designing can be more realistically undertaken.

In addition, pedestrian and vehicular circulation diagrams — linking the relevant spaces and applicable site constraints — can be undertaken, usually concurrently. Consultant input, especially related to mechanical and electrical space requirements as well as vehicular traffic and vertical transportation systems, may be sought at this stage.

On large and complex projects, the architect should ask the client to approve such diagrams as they are developed.

Having undertaken and established some basic planning relationships in the form of these flow and space diagrams, the architect, with input from the design team, must then consider the overall form which the project could take.

Using sketches and block models, the architect investigates various forms and relative volumes for the building project. From such massing studies, the architect can:

- establish the sculptural quality of the building;
- visualize the space between buildings (proposed and existing);
- determine the effect of sun, shade, snow, rain, and wind on the project and its surrounding environment.

Engineering Services for Schematic Design – Integrated Design

The Integrated Design Process helps to ensure that all building systems and components, such as site design, structure, orientation, envelope, lighting and ventilation are viewed as interdependent. During the schematic design phase, the architect usually facilitates the design team, including structural, mechanical, and electrical engineers. Other specialist sub-consultants may be required, depending on site conditions and programmatic requirements. Engineering sub-consultants help prepare the construction budget submitted at the completion of the schematic design stage (refer to Chapter 2.3.3, *Cost Planning and Control*). The project will progress more smoothly if the consultants become familiar with the site and program requirements early on in the process.

Engineering sub-consultants also help prepare the construction budget submitted at the completion of the schematic design stage (refer to Chapter 2.3.3, C*ost Planning and Control*).

As the general form of the facility emerges from programmatic data, engineers from the various disciplines work with the architect to develop structural, mechanical and electrical, designs and building system concepts which are appropriate to the project goals. Early involvement by design engineers is a significant factor in obtaining the synthesis of building elements that can lead to reduced capital costs and improved building performance.

Design Alternatives: Evaluation and Selection

The project program may include more than one possible path to follow for planning or for developing architectural concepts. In these circumstances, the architect may prepare design alternatives for the client to consider.

At the schematic design stage, design alternatives should involve quick diagrammatic studies to address issues such as circulation, planning, and volumetric aspects of the project, without developing architectural detail. Some clients may want to review multiple options, thinking that this demonstrates a thoroughness of process. These options should be limited to simple planning diagrams. The number of options should be limited and based upon the fee proposal and the agreement with the client. One design alternative should then be selected and developed in more detail. The architect must strike a balance between providing an appropriate level of basic

services and undertaking extensive studies that should be identified (and billed) as optional or additional services.

Design alternatives should be evaluated and selected on the basis of:

- completeness of response to program elements;
- success in resolving functional relationships and adjacency requirements;
- compliance with previously established sustainable goals;
- the merits of alternative structural, mechanical, and electrical systems;
- comparisons of building efficiencies, including:
  - ratio of net to gross floor areas;
  - ratio between circulation and usable floor areas;
  - wall surface to floor area ratios;
  - capital, operating, and maintenance costs.

Building Cost Analysis

During schematic design, the architect prepares preliminary cost estimates, usually based on the area or volume of the proposed building, multiplied by the appropriate unit costs (refer to Chapter 2.3.3, *Cost Planning and Control*). Sometimes it becomes clear at the schematic design phase that the client's expectations cannot be met within the current budget. In this case, the architect needs to work with the client to adjust the scope of work or the quality, or alternatively, provide for an increase in the budget.

Documentation and Presentation

Schematic design documents illustrate the functional relationships of the project elements as well as the project's scale and character, based on the final version of the functional program, the schedule, and the construction budget. The design documents may include:

- a site plan;
- principal floor plans;
- vertical sections;
- building elevations;
- illustrative sketches or perspective renderings, computer-generated presentations;
- massing models.

In addition to design documents, it is often appropriate to prepare a report containing the following:

- design approach or philosophy;
- sustainable goals and environmental features;
- probable construction cost (with appropriate qualifications — refer to Chapter 2.3.3, *Cost Planning and Control*);
- summary of status of design with respect to applicable environmental, planning, and zoning regulations as well as building codes;
- preliminary schedule for design and construction start and completion and the form of construction procurement;
- description of structural, mechanical, and electrical systems;
- basic area calculations and analyses;
- site data;
- product and material description and sample of key construction materials or finishes.

The architect reviews the documents with the client and should obtain written approval before beginning design development.

Standard Contract Documents and Checklists

A list of the services to be provided in the schematic design phase is contained in Schedule A or Schedule B, Schedule of Architect's Services and Client Responsibilities, for use with the *Canadian Standard Forms of Contract Between Client and Architect: RAIC Document Six and in Schedule A -Schedule of Architect's Services and Client's Responsibilities of Canadian Standard Forms of Agreement Between Client and Architect — Abbreviated Version: RAIC Document Seven*.

A detailed "Checklist for the Management of the Architectural Project," including requirements during the schematic design phase, is available at the end of Chapter 2.3.1, *Management of the Project*.

References

Allen, Edward and Joseph Iano. *The Architect's Studio Companion: Technical Guidelines for Preliminary Design*. Toronto, Ont.: John Wiley & Sons, 1989.

Buildinggreen.com—Articles related to Integrated Design Process
www.buildinggreen.com

G.F. Shymko and Associates Inc. "C-2000 Design Facilitation, Overview of Facilitation Experiences in the Alice Turner Branch Library." Vancouver, B.C.: May 1998.

Larsson, Nils. "The C-2000 Program: Changing the Design Process." Ottawa, Ont.: Natural Resources Canada, September 1998.

The Royal Architectural Institute of Canada. Ottawa, Ont.

Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six. 2006 Edition.
Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: Document Seven. 1997.

Whole Building Design Guide
www.wbdg.org/design/engage_process.php



2.3 Management of the Project

2.3.6 Design Development

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Introduction

Design Development Tasks

Engineering Services for Design Development
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- Mechanical
- Electrical
- Other Consultants

Regulatory Reviews and Approvals

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Documentation and Presentation
- Drawings
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Suggested Table of Contents for a Design Report

Design Development

Introduction

During the design development phase, the selected scheme — which was prepared during the schematic design phase — is **refined and developed in more detail**. Refer to Chapter 2.3.5, *Schematic Design*, for a discussion of this first phase of the project.

Because it is sometimes difficult to differentiate between when the schematic design phase ends and when the design development phase begins, some architects and most engineers combine these two early phases into a single phase, termed "preliminary design." However, it is advantageous to obtain initial approval of the early concept from the client before proceeding to more specific design details. Engineers and some clients frequently use the term "design" to refer to construction documents as well as preliminary design. It is important to have a mutual understanding of each phase and to plan for the appropriate documentation when communicating with engineers. The distinction between all the three phases - schematic design, design development and construction documentation - is very clear in the French language (esquisse du projet, projet préliminaire and projet définitif).

Once the design is developed and accepted by the client, the project can move into the next phase — construction documentation. Refer to Chapter 2.3.7, *Construction Documents — Drawings*, and Chapter 2.3.8, *Construction Documents — Specifications*, for this stage of a project.

This chapter briefly describes the services of the architect during the design development phase of a project.

Design Development Tasks

The various alternative Schedules of Architect's Services and Client Responsibilities to be attached to of the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six* outline some of the architect's responsibilities during design development. During this phase, refining the design usually entails the following tasks:

- preparation and coordination of all architectural, structural, mechanical, and electrical designs;
- preparation of outline specifications;
- performing preliminary modeling and simulations (such as energy analysis and daylight simulation) if included in the architect's services;
- additional review with Authorities Having Jurisdiction;
- preparation of presentation documentation (such as drawings, models, computer renderings, as agreed to in the client-architect agreement);
- update of the construction cost estimate;
- update of the schedules for design, preparation of construction documents, and time frame for construction.

During the design development phase, it is important to resolve the design of all major components. At this stage, the input and collaboration of the consultants is critical to the success of the project. A well-integrated design will minimize delays and coordination problems during the next phase of the project. Major revisions at a later stage will be costly to the client, the architect and consultants and can result in compromises to the architectural design concept.

During design development, the client is responsible for the following:

- reviewing and commenting on the design;
- providing approval of the design and authorizing the preparation of construction documents.

One of the roles for the architect during design development is to investigate various manufactured products for incorporation into the future building. Sometimes the functional program outlines the requirements for durability and maintenance of certain products. During design development, the architect should assess the maintenance and durability of various materials as well as their cost and performance to determine if they meet the client's needs.

Prior to making a final recommendation to the client, the architect can review the following factors:

- availability of the product or system from the manufacturer or supplier as well as the types of warranties available;
- availability of technical data, samples, and literature on the product;
- performance criteria (including sustainability, suitability for application and compatibility with other materials);
- durability and maintenance requirements;
- physical characteristics and availability of various colours, finishes, textures or other features;
- fabrication and installation requirements;
- cost;
- time for delivery;
- past performance;
- comparative analysis with similar products in the marketplace.

Engineering Services for Design Development

As previously indicated, continuing to coordinate the design work at this stage with all engineering disciplines is critical to the success of the project. Collaboration with the engineers should begin in the schematic design phase of the project and continue intensively during design development.

Structural

During the schematic design stage, the structural engineer usually develops alternative framing plans which indicate basic elements such as typical bays and their spacing together with their associated costs. The engineer may analyze various framing systems such as concrete, steel, and timber. At this stage, an economical and functional framing system and appropriate bay size is usually selected; however, the architect and engineer must also take into account a number of other considerations such as availability of the material and appearance of the system. This decision is also frequently dictated by functional considerations.

Subsequently, in order to commence design development, the architect should provide the structural engineer with the following information:

- the soils or geotechnical report (usually prepared at pre-design stage and supplied by the client);
- the selected schematic design;
- restrictions regarding the locations of columns or other structural supports;
- defined areas, including use, size, and finishes;
- preliminary code analysis including fire separations and fire ratings;
- the size and locations of openings;
- construction materials;
- a confirmation of the method of construction project delivery and the expected time frame which was selected by the client in the schematic design phase.

Some of the design issues which must be resolved with the structural engineer and the members of the design team through an Integrated Design Process include:

- typical bay framing, including typical sizes of beams and columns;
- maximum depths of members and all critical sizes of members;
- size and location of openings through the structure for all work by other disciplines;
- minimum ceiling clearances to the underside of the structure and all floor to floor heights;
- identification of items to be embedded into the structure;
- requirements regarding fire ratings and fire separations;

- provisions for special equipment and typical mechanical equipment, including window washing equipment, mechanical rooftop units, self-leveling docks, chimneys, slab depressions, etc.

Mechanical

The client's requirements for operation and maintenance (for example, availability of stationary engineers) and the requirement for emergency standby and dual-equipment systems should have been included in the functional program. If these were not part of the program, the architect should assist the engineers in determining the client's requirements and ascertain if the mechanical design meets these needs.

To undertake design development, the mechanical engineer will require various types of information, including:

- the selected schematic design;
- type of glazing and type of window coverings;
- hours of use of the building;
- allowable variation in room temperatures and humidity;
- areas requiring special treatment for air conditioning, fire protection, plumbing, noise;
- preliminary code analysis including fire separations;
- requirements for mechanical system controls and special controls and energy management;
- analysis of water and special waste removal equipment;
- other special equipment, such as lawn sprinklering systems.

The architect or the client may provide some of this information, or the mechanical engineer will obtain some of the information directly from the appropriate authorities.

During the design development phase, the mechanical engineer selects and resolves select and resolve the following:

- natural ventilation
- central versus individual heating and cooling plants;
- size of air conditioning equipment;
- size of heating system;
- special HVAC systems such as heat recovery systems, heat pumps;
- energy analysis and modeling, if part of the agreed professional services;
- size and location of major ducts and pipes;
- approximate size of all mechanical equipment;
- plumbing fixtures and controls;
- other features, such as noise control, vibration dampers, special controls.

In addition to preparing a set of design development drawings, the mechanical engineer usually develops information on future operating costs for the proposed building. This information should provide the operating costs of mechanical equipment for various options of building materials in order to assist the architect in making a final recommendation to the client regarding all components of the building envelope and assembly.

Electrical

To undertake the design development documents, the electrical engineer requires the following information:

- the selected schematic design;
- information on typical areas, including function, size, finish and materials, lighting levels;
- the future expansion and flexibility required for each space;
- the method of construction project delivery and expected time frame.

During the design development phase, the electrical engineer resolves the following design issues related to the electrical systems:

- the anticipated electrical load and allowances for future expansion;
- requirements of incoming electrical services and any space requirements for a vault or sub-station;
- the distribution of power and utilization voltages;
- locations for electrical closets, communications rooms, bus-duct risers;
- requirements for embedding conduits;
- light fixture selection and requirements for ceiling systems and ceiling space;

- switching and controls for energy efficiency;
- telecommunications and data systems, fire alarm systems, public address systems, intercom, security.

For the lighting design, the architect works with the electrical engineer to develop lighting layouts. This layout is often developed with the use of the architectural reflected ceiling plans with input from the electrical engineer or a specialist lighting consultant.

Other Consultants

In addition to the consultants providing normal engineering services, many other consultants may be involved at the design development stage of a project. Refer to Chapter 1.2.3, *Consultants*, for a list of some of the consultants required for different architectural projects. It is also necessary at this stage of a project to determine the requirements from certain manufacturers of various building systems such as elevator companies and suppliers of wall cladding systems.

Regulatory Reviews and Approvals

The architect should have commenced the review with Authorities Having Jurisdiction during the schematic design phase of a project; however, it is important to maintain contact with authorities and to review certain details with the appropriate Authority Having Jurisdiction. Development permits and planning approvals are frequently obtained at the design development phase. Building permits and some other approvals are usually not obtained until the completion of construction documents; however, if the Authority is aware of the details and content of the project design, approval is facilitated.

Refer also to Chapter 1.2.4, *Building Regulations and Authorities Having Jurisdiction*.

Building Cost Analysis

The architect or a cost consultant may prepare an updated estimate of the construction cost during design development. Additional design information from the design development phase facilitates the preparation of a more complete and accurate estimate with a reduced contingency allowance. Refer to Chapter 2.3.3, *Cost Planning and Control*, for information on construction cost estimates and the requirements at the design development stage.

Documentation and Presentation

The design development documents are used for a variety of purposes and by several participants in the design process. Some of the uses of these documents include:

- client review and approval;
- reviews with Authorities Having Jurisdiction and public groups;
- consultant input and coordination;
- update of construction cost estimates;
- the basis to prepare the construction documents.

The documents should adequately describe and "finalize" the design for the entire project in order to form the basis for reviews and for the completion of construction documents. For projects of a certain scale, design development documents may include three separate components:

- drawings;
- outline specifications;
- a design report.

Drawings

The drawings produced at the design development stage should provide adequate information to the client, consultants, and Authorities Having Jurisdiction to explain major components of the project. Depending on the size and complexity of the project and the services outlined in the client-architect agreement, the drawings may include the following:

- the site plan (in some jurisdictions, it is necessary to prepare a detailed site plan for site plan approval or the site plan control process at this stage);
- all floor plans and all building elevations;
- sections;
- plans describing the structural, mechanical, and electrical systems;
- details of significant design features and building materials;
- preliminary furniture and equipment layouts;

- presentation drawings which might include computer renderings, colour boards, interior and exterior views.

Outline Specifications

It is important at this stage of the project to present, review, and obtain approval from the client and other stakeholders of major building components and the site design. This is usually achieved in part through the preparation of a an outline specification which describes the proposed materials and construction systems in general terms and provides basic information on appearance, texture, operating and performance criteria, etc. This type of specification is described briefly in Chapter 2.3.8, *Construction Documents — Specifications*.

Design Report

For some projects, it may be useful or even a contractual requirement to document significant design decisions and design criteria at the end of design development. This is usually accomplished by means of a "design report."

The design report is a tool for use by clients and other stakeholders. It is also useful for those who may not be familiar with the project to better understand the design, such as:

- staff in the architect's office;
- Authorities Having Jurisdiction;
- financial institutions;
- building users and facility managers;
- another architect who may be undertaking construction documentation as part of a joint venture;
- consultants.

It also serves as a record for the project which may require lengthy approval periods or which is subject to delays.

An analysis of the building with respect to compliance with the building code is often included in the design report. A "Suggested Table of Contents for a Design Report" is provided at the end of this chapter.

Checklists

Refer to the "Checklist for the Management of the Architectural Project" in Chapter 2.3.1, *Management of the Project*, which lists management tasks to be undertaken prior to and during the design development phase.

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   - 4.1.3 Circulation
   - 4.1.4 Functional Layout and Interior Features
   - 4.1.5 Finishes

   4.2 STRUCTURAL Design
   - 4.2.1 Foundations
   - 4.2.2 Structural System and Framing

   4.3 MECHANICAL Design
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   - 4.3.4 Equipment Room
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5. **Outline Specifications**

6. **Sustainable Design Features**

7. **Building Code Analysis**

8. **Summary of Building Areas**

9. **Construction Cost Estimate**



2.3 Management of the Project

2.3.7 Construction Documents — Drawings

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2.3.7

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Construction Documents — Drawings

Introduction

Construction documents include the drawings and specifications. These documents guide and direct the contractor and the sub-contractors in the preparation of their price or bid, and in carrying out their "work" on a project. For this reason, drawings are frequently called "working drawings." As part of the construction contract, the working drawings take on a legal significance for which architects must assume responsibility.

This chapter discusses the production of working drawings. Refer to Chapter 2.3.5, *Schematic Design*, and to Chapter 2.3.6, *Design Development*, for information about preliminary design drawings that are prepared prior to the working drawings. Chapter 2.3.8, *Construction Documents — Specifications*, discusses the specifications that accompany and complement working drawings.

Architects should obtain client approval of the design development documents **before** beginning the construction documents. A formal approval should be received in writing to ensure that the client understands the importance of this decision and the expense of producing the construction documents. The project architect should explain to the client that any changes requested while working drawings are being prepared will entail delays (and costs). Any type of change can have a "ripple" effect on a number of different drawings, including engineering working drawings.

Purpose of Drawings

Drawings are a means of communicating information in a two-dimensional format using lines, graphic symbols, and text. Buildings are sometimes designed and documented as three-dimensional models using Building Information Modeling (BIM) which can produce both two-dimensional and three-dimensional drawings for construction purposes. Both types of drawings drawings describe the relationships between building components (sometimes referred to as building assemblies) and the following characteristics:

- location of the component;
- name or identification;
- size and dimension;
- shape and form;
- details or diagrams of connections for the building assembly.

Many different individuals and organizations use drawings for a variety of purposes. The primary users are the contractor, sub-contractors, consultants, the client or owner, and the architect — the parties that are bound to one another to design or construct a building. Other users include:

- Authorities Having Jurisdiction;
- product manufacturers and suppliers;
- financial institutions;
- tenants and end users of the building;
- facility managers and maintenance personnel;
- other construction industry professionals.

The working drawings are used by:

- *bidders:*
  - to prepare bids;
  - to obtain bids from their sub-contractors and suppliers;
- *selected contractor(s):*
  - to form part of the documents for a contract with the client;
  - to guide them in carrying out the work;
- *Authorities Having Jurisdiction:*
  - to verify that the project conforms to existing regulations;
  - to plan for the provision of utilities and services;

- *architects and other consultants:*
  - to obtain bids or prices for construction procurement;
  - to communicate project particulars to clients in order to obtain approval;
  - to prepare "Class A" cost estimates;
  - to review the work on site and to determine general conformity with the intent of the construction documents;

- *clients:*
  - to confirm that the project will meet their particular requirements;
  - to approve this part of the bid package;
  - to form part of the documents for the contract with the contractor.

Planning the Production of Working Drawings

The preparation of working drawings is the project phase that demands the most of the architect's time and resources. It is essential to plan the production to ensure that proper, coordinated documents are produced within the budget of fees allocated for this purpose.

The project architect or project manager is usually the individual responsible for planning the production of working drawings. When scheduling the work, the project architect must consider:

- the available production budget;
- the available human resources;
- the firm's physical resources and computer systems (hardware and software);
- the time frame for production of the working drawings;
- the resources available to the consultants.

The project architect must therefore:

- determine what drawings and information must be produced;
- calculate how much time is needed to produce each drawing;
- assign tasks;
- set the project schedule;
- manage and coordinate the work with all team members.

The project architect in charge of producing the complete set of working drawings coordinates the work of the design team (engineers and other consultants). Usually management and coordination of engineers and other consultants is a part of the architect's services and responsibilities; however, occasionally it is contracted to others.

At the start of the construction documents phase, the project architect should meet with the entire consultant team in order to agree on:

- the production schedule;
- standards for preparing and presenting the drawings;
- protocols for the exchange of information or electronic file transfer (if this has not already been agreed upon in a previous phase);
- financial arrangements for the reproduction and use of all drawings and other instruments of service;
- general coordination methods.

Using traditional two-dimensional drawings, the project architect should provide the team with basic floor plans so that each discipline can develop its own drawings. Engineers should regularly forward their drawings to the project architect to allow time for revision and coordination. Using Building Information Modeling (BIM), the architect must determine how to manage the data and whether to share the particular model, or, to provide two-dimensional CAD files to outside team members.

For smaller projects, the engineers may only produce notes and information which will be included on the architectural drawings. In these circumstances, it is necessary to clearly establish responsibility for the appropriate part of the design and arrange for engineers to append their seal and signature to the drawings.

The "Checklist for the Management of the Architectural Project" in Chapter 2.3.1, *Management of the Project*, can assist in planning the production of working drawings.

CAD Standards

CAD (Computer-Aided Drawing) has replaced manual drafting as the primary method for producing working drawings.

Production techniques may vary within the same office, depending on the human and physical resources available and the nature of the project. Some clients require that drawings be prepared using certain standards.

Standards define the size and style of fonts, dimensions, lines, and hatching or other ways to represent materials. They also suggest various ways to create borders and title blocks, standard details, symbols, etc.

It is especially important to establish a standard system for naming and giving attributes to layers in order to facilitate the development of working drawings and make them user-friendly for consultants and others. Some clients will require electronic files of the working drawings (or record drawings) for the future management of their building. Therefore, architects must often use the client's layering system or other drawing standards.

Some institutions, such as Public Works and Government Services Canada (PWGSC) and large health and educational institutions, have created their own drawing standards. It is important to obtain these standards at the start of the project.

It is important, at the start of the project, to establish protocols for the creation and transfer of electronic information.

The United States National CAD Standard is a consensus standard incorporating industry publications. It is comprised of interrelated standards, guidelines and tools for uniformly organizing and presenting drawing information. It is the only comprehensive standard for facility planning, design, construction and operation drawings. NCS v4.0 is comprised of the National Institute of Building Sciences' Foreword, Administration, and Plotting Guidelines modules, the American Institute of Architect's CAD Layer Guidelines module, and the Construction Specification Institute's Uniform Drawing System modules.

The UDS™ is a guideline which includes the following modules:

- **Drawing Set Organization** (numbering system and sequence for drawings, etc.);
- **Sheet Organization** (system for numbering drawings, details and organizing sheets);
- **Schedules** (format, heading terminology, and organization);
- **Drafting Conventions**;
- **Symbols**;
- **Terms and Abbreviations**;
- **Layers** (see note below);
- **Notations**;
- **Code Conventions** (probably not relevant to Canada).

The Uniform Drawing System™ has adopted the AIA CAD Layer Guidelines which were originally developed and published by the AIA.

Building Information Modeling or BIM

Many architecture practices in Canada have implemented BIM or are considering this fundamental change in the way building designs are conceived, completed and delivered.

BIM is *"the creation and use of coordinated, consistent, computable information about a building project in design that yields reliable digital representations of the building – representations used for design decision-making, production of high-quality construction documents, performance predictions, cost-estimating and construction planning, and, eventually, for managing and operating the facility."*

While BIM's benefits may be numerous, many architectural practices are cautious about the amount of time and financial investment required to change from current practices.

Some of the possible advantages of switching from 2D CAD to BIM include:

- BIM works the way some designers think by using the common language of building elements (wall, door, floor, etc.);
- Document coordination may be enhanced and simplified. A single building information model allows consistent and coordinated views and details to be selected easily for sheet layout and printing;

- 3D visualization can assist the entire project team in understanding the building form, and identifying challenges and opportunities in the design. Clients and lay people appreciate the visual imagery of 3D modeling and increasingly expect it. BIM software allows for visual output, ranging from simple grey scale 3D representations, cut-away 3D sections, to photorealistic renderings from a single building information model without the need for specialized software or skills;
- Collaboration with other architects, designers and consultants may be simplified with the interoperable platform of BIM software;
- BIM models can be exported to common two-dimensional drawing formats (such as .dwg or .dxf), and to spreadsheets to create schedules (invaluable for costing, material take-offs, etc.)

In addition, Building Information Models have great potential for expanding architectural practice through their various embedded analysis tools. As sustainable design becomes fundamental to many architects, the ability of BIM to embed energy modeling within the program or to export data to similar analysis programs becomes an advantage over traditional 2D or 3D software programs. Similarly, the parametric qualities of BIM objects allow designers to quickly do quantity take-offs for costing; areas for leasing and functional programming, and to create custom schedules for virtually all building components including doors, equipment, millwork and finishes. There is an emerging potential for Building Information Models to be used for facilities management and therefore an opportunity for architectural firms to diversify their services.

Building Information Modeling does present unique challenges for the profession including the development of new internal office protocols; the "ownership" of the model; and the need for new forms of agreement.

Drawing Information

The amount and type of information that must be provided on the working drawings are a function of:

- the complexity of the project;
- the type of construction project delivery, including the bid and type of construction contract.

When the project involves restoration, renovation or an addition to an existing building, drawings should clearly indicate the limits of the work, existing elements, and conditions prevailing at the junction of existing and new construction components.

The form of project delivery has an impact on the working drawings.

For projects involving a public bid call or using a project delivery method with a stipulated price contract, drawings should be complete and comprehensively detailed to avoid requests for contract changes by the contractor (whose identity is not known when the drawings are prepared). If, on the other hand, the contractor has already been chosen and has previously worked on similar projects with the architect and the client, the drawings may not have to be so detailed. With some forms of contract and project delivery methods, construction documents may be supplied as the work progresses.

When the project is being carried out as a construction management contract and is divided into separate bid packages, with a bid call for each, there may be several deadlines for the production of working drawings. In such cases, timely and thorough coordination of all documents is essential to avoid overlapping or conflicting requirements. Bid packages, including the working drawings, should correspond to clearly defined and self-contained elements, such as:

- Bid Package No. 1 — Demolition;
- Bid Package No. 2 — Excavation, Foundation, and Structural Framing;
- Bid Package No. 3 — Building Envelope and Mechanical and Electrical Services;
- Bid Package No. 4 — Interior Finishes.

On a project involving the use of new or unusual construction procedures, the drawings should furnish the corresponding details.

In all cases, the final set of working drawings, together with the Project Manual (Specifications, Contract Forms and Contract Conditions, and

Bidding Information), should provide sufficient information needed to:

- **prepare** bids or accurate construction cost estimates (quantity and type of materials and their application);
- **obtain** the building permit and other approvals from Authorities Having Jurisdiction;
- **construct** the project.

Organization of Drawings

To produce working drawings, one must first create a list of information required, including a preliminary list of drawings. Drawings and documents prepared during the design development phase may be used to determine which construction details must be drawn. This list also enables the project architect to ascertain which elements require additional research or information from the client or consultants. The format of all drawings, including those of the engineers and consultants, should be consistent.

Refer also to the CSA Standard B78.3-M1977 (R1991), *Building Drawings*, for information on preparing drawings.

Scales

In the past, it was necessary to determine and decide on a scale for each working drawing. Today, most computer software is not scale-dependent; however, it is important to determine the scale for any hard (paper) copy. Generally speaking, the smallest scale in which information can be clearly presented is chosen. Hard copies that are reduced for distribution must still be legible. A graphic scale should be indicated on these documents.

List of Drawings, Numbering, and Sizes

Each sheet of the working drawings must have a title and a number. The Uniform Drawing System™ provides guidelines for a standard, yet flexible, system of title blocks and sheet numbers.
The range of ISO formats may be used for the sizes printed drawing sheets (refer to Illustration 1). This range offers the following features that are useful when drawings must be reproduced on a larger or smaller scale:

- the surface area of each format is twice that of the preceding format;
- any two consecutive formats have the same height-to-width ratio (that is, the same proportions).

Clients may sometimes have their own format for title block and sheet sizes, and many architectural practices have developed their own specific preferences and designs.

Title Block

The title block may contain the following information:

- project name and address/location;
- project number;
- date including date of first issue and dates of all revisions;
- purpose for issuing the drawing;
- drawing title;
- drawing number;
- scale;
- details indicating revisions (such as revision number, date, general description, initials of the originator);
- name and contact information
  [Note: in many provinces, the name of the holder of the Certificate of Practice must appear];
- name or initials of the draftsperson and the

Illustration 1: ISO Formats

Format name	A0	A1	A2	A3	A4	A5	Etc.
Surface area in m^2	1	0.5	0.25	0.125	0.0625	0.03125	Etc.
Dimensions in mm	841 x 1189	594 x 841	420 x 594	297 x 420	210 x 297	149 x 210	Etc.

individual checking the drawing;
- a location for applying the professional seal and signature.
  [Note: refer to the regulations of the provincial associations of architects for regulations on applying the professional seal. See also the chart, "Comparison of Provincial Requirements/Guidelines regarding the Application of Seals," in Chapter 1.1.5, *The Organization of the Profession in Canada*.]

Usually, the drawing (either in the title block or elsewhere) includes the following information:

- key plan, indicating the relationship of partial plans to the overall plan, orientation, etc.;
- the electronic file name;
- dates and notations indicating the purpose for issuing the drawing (such as "Issued for Bid" and "Not for Construction");
- notice of copyright.

Refer to Appendix A of this chapter for more information on copyright.

Refer also to Section 5.2, "Drawing Notations", in Chapter 2.4, *Sample Forms for the Management of the Project*.

Depending on the type of project and the contractual arrangement with the consultants, as well as the requirements of the professional liability insurer, the title block includes the name, address, telephone, and fax numbers of engineers or other consultants. Also, the architect should confirm the requirements of the provincial association.

Notes, Symbols, and Dimensions

Notes, symbols, abbreviations, dimensions, and references to other drawings should be expressed in the same way on all the drawings, using recognized conventions.

Notes on the drawings should be kept to the minimum necessary to understand the architect's intentions. (References to standards and instructions about the execution of the work should be included in the specifications, not on the drawings.) Standard symbols should be used to show structural grids on the plans, as well as references to elevations, sections, details, and enlarged plans. References to sectional views, windows, and details are usually indicated on the elevations. References to details are usually indicated on the cross-sections and wall sections.

If a material is identified on the drawings by a generally accepted symbol, a defined symbol or a generic name, no further descriptive notes are necessary. Too many notes obscure the drawings, increase search time to find information, and promote inconsistency and duplication. Repetitive items such as doors, windows, and interior finishes should only provide a reference to identify the material or components. Schedules — such as room finish, door, and window schedules — should be used to simplify and clarify repetitive information.

Drawings identify a material or product only by a generic name, and illustrate its approximate shape, dimensions, and location.

Generally speaking, plans indicate the length and width of buildings as well as the width and thickness of walls, whereas elevations and vertical sections indicate height. Drawings should include all of the plans, elevations, sections, and details necessary to carry out the work.

The method of dimensioning should correspond to the sequence of construction. For example, new elements that are to be added should be identified in relation to previously constructed elements such as the structural system or existing walls.

If the total of a set of dimensions must add up to a given dimension, it may be necessary to give an approximate value for one dimension or even to omit one of the less critical dimensions.

Refer to the Checklist: Internal Review of Drawings at the end of this chapter for a detailed list of information that is recommended to be included on all plans and drawings.

Coordination of Drawings

The project architect needs to be fully aware of the progress of the drawings. Therefore, at intervals appropriate to the project's complexity, the project architect may:

- arrange internal and external coordination meetings;
- review and revise drawings as they are being developed.

It is particularly important to plan regular meetings and to exchange information with project engineers on an ongoing basis. The project architect usually notes and documents the following:

- decisions;
- suggested changes;
- new requirements from the design team.

Coordination of the drawings with specifications is also necessary. In particular, the drawings and the specifications should use the same generic terms to avoid ambiguity and therefore reduce the risk of disputes during the execution of the work. Standard construction contracts (such as General Conditions 1.1 of CCDC 2) indicate that the specifications govern, or take priority over, the drawings in case of discrepancies between the drawings and specifications. CCDC 2, GC 1.1.7 also indicates that "*drawings of a larger scale shall govern over those of smaller scale of the same date*" and that "*later dated documents shall govern over earlier documents of the same type*".

Client-supplied equipment must also be coordinated. Client changes to the program or modifications to the layout can have far-reaching consequences at this stage and the architect should be remunerated accordingly. If the architect is engaged to manage and coordinate the consultants, then the project architect will arrange for each confirmed change to be:

- communicated to the various engineers and consultants;
- integrated into the working drawings and other construction documents.

The best tool is a **checklist** which outlines all the steps in producing and coordinating a complete set of construction documents. Some examples of checklists are found in the following publications:

- *REDICHECK Interdisciplinary Coordination;*
- *Cross Check: Integrating Building Systems and Working Drawings.*

Depending on the scale and complexity of the project, the architect may carry out the following review procedures:

- conduct interim and final reviews before completing the working drawings;
- ensure that the client reviews the drawings and specifications;
- ask a senior architect in the practice who is not associated with the project to check the drawings;
- require different individuals to conduct partial reviews (for example, dimensions, details, notes);
- check all dimensions twice;
- ensure that the specification writer conducts a final review of the working drawings.

Refer also to Chapter 2.1.9, *Risk Management and Professional Liability*, which provides tips for checking drawings.

Revisions to the Drawings

In practice, changes to certain design elements may be necessary as the construction details are reviewed, developed, and coordinated with the details and specifications of engineers and other consultants.

To ensure proper coordination, the project architect may:

- obtain information from the client about special technical needs related to the project (for example, medical equipment);
- inform the client about significant changes (and submit alternative solutions, if possible and appropriate);
- make the client aware of the importance of making decisions and giving approvals quickly.

The engineers and other consultants should also be advised of any modifications or design changes.

To identify revisions, the title block of each revision of the drawings should indicate the date, the reason for the revision, and the nature of the changes.

Engineering Drawings

Structural Drawings

During the preliminary design phases of the project, the architect and the structural engineer should have already determined the structural framing system. During the construction documents phase, the structural engineer prepares:

- detailed calculations of all structural elements;
- plans and details;
- structural sections of the specifications (usually Divisions 03, 05, and 06);
- a final construction cost estimate of the structural components.

Mechanical and Electrical Drawings

Depending on the nature of the project, mechanical drawings are for the trades of heating, ventilation, and air conditioning (HVAC); plumbing and drainage; and specialty trades (such as sprinklers, gas piping). The mechanical engineer usually prepares a separate set of drawings for each trade.

During the construction documents phase, the mechanical and electrical engineers should prepare:

- detailed calculations;
- plans, details, and schematic diagrams;
- mechanical and electrical sections of the specifications (Divisions 21 to 29 inclusive);
- a final construction cost estimate of the mechanical and electrical components.

Coordination of Engineering Drawings

If the architect is retained to manage and coordinate the project team, one of the architect's most important tasks during the production of the drawings is the coordination of the engineering drawings (and drawings from other specialists). Coordination is not to be confused with designing and documenting the technical content contained in the engineering drawings which is the responsibility of each respective engineer. The architect will check that all relevant information is on the appropriate drawing and that the design of one discipline includes the necessary work to accommodate the work designed by another engineer. For example, problems due to the interference of conflicting elements such as ductwork, light fixtures, piping, and the structural framing system must be resolved.

Sharing all necessary information with the engineering consultants as soon as it is available helps to minimize coordination problems. Regular coordination meetings or "interdisciplinary coordination reviews" are also essential for ongoing information exchange and to collectively solve any coordination issues. The earlier that these meetings are held during the production of the drawings, the more "willing" each professional is to accept ideas and revisions from other members of the consulting team. Consultants are less willing to make significant changes to the drawings at a later stage in their production. Any design changes, and the reason for the design changes, should be immediately distributed to all engineers. Using a checklist can be helpful in identifying all elements which require coordination.

Frequently, one of the engineering disciplines is required to redesign or relocate an element. The architect, as manager and coordinator, must decide how and which discipline will make the necessary adjustments. When coordinating and revising the design of one of the engineers, the architect should consider the following questions:

- Which solution would the client prefer?
- Is the architectural concept and design maintained?
- Which is the most efficient and economical approach?
- Are there other alternatives?

With proper interdisciplinary coordination, all those affected by the construction project benefit as a result of fewer Change Orders, requests for time extensions, and liability claims.

Definitions

Attribute: Data (such as a door number or column) attached to an entity, block or symbol within a CAD drawing.

BIM or Building Information Model: A Building Information Model (BIM) is a digital representation of physical and functional characteristics of a facility. As such it serves as a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life-cycle from inception onward. A basic premise of BIM is collaboration by different stakeholders at different phases of the life cycle of a facility to insert, extract, update, or modify information in the BIM to support and reflect the roles of that stakeholder. The BIM is a shared digital representation founded on open standards for interoperability. *from the National Building Information Model Standards (NBIMS) Committee*

Construction Documents: The working drawings and the specifications. (When combined with the contract and contract conditions, these documents form the contract documents.)

Coordinate: to bring (parts, movements, etc.) into proper relation, cause to function together in proper order. *(adapted from the Oxford Concise Dictionary)*

Coordination: the arrangement and direction of work of others by a person (e.g. supervisor) or entity (e.g. general contractor) in a special manner to minimize conflicts, delays, interferences, etc., among such others. *from Carson's Construction Dictionary - Law and Usage in Canada.*

Drawing: Graphic information, which may also contain text, organized on a two-dimensional surface for the purpose of conveying data about a specific portion of a project.

Layer: A group of functionally similar bits of information that can be manipulated or displayed as a unit and possessing common attributes; a property of a CAD drawing used for classifying information in order to control visibility and manipulation; sometimes called a "level."

Schedule: Tabulated information on a range of similar items, such as a "Door Schedule" or "Room Finish Schedule."

References

Canadian Standards Association (CSA). Toronto, Ont.
CSA Standard B78.3-M1977(R1991), *Building Drawings*. 1977.
CSA Standard B78.5-93, *Computer-Aided Design Drafting (Buildings)*. 1993.

Demkin, Joseph A., executive editor. *The Architect's Handbook of Professional Practice*. The American Institute of Architects. Hoboken, New Jersey: John Wiley & Sons, Inc. 2008.

Guthrie, Pat. *Cross-Check: Integrating Building Systems and Working Drawings.* New York, NY: McGraw-Hill, 1998.

Nigro, William T. *REDICHECK Interdisciplinary Coordination*. Third Edition. Peachtree City, GA: The REDICHECK Firm, February 1992.

Ontario Association of Architects, Practice Bulletin 45, Coordination of Consultants, April 1988. To be updated and re-issued as a "Practice Tip".

Sanders, Ken. Digital Architect: A Common-sense Guide to Using Computer Technology in Design Practice. New York, NY: John Wiley & Sons, Inc., 1996.

The Royal Architectural Institute of Canada: Building Information Modeling (BIM) Practice Builder. 2007. *www.raic.org/practice/bim/bim-practice-builder_e.pdf*

United States National CAD Standard, version 4, 2008
www.buildingsmartalliance.org/ncs

Appendix A — Digital Copyright and Architects

Wanda Noel, Barrister and Solicitor

The Issue

People who produce material in digital form often think that "www" stands for the Wild Wild Web. They ask themselves whether freedom on the Internet means the freedom to use the creative works of others, without asking permission, or paying the copyright holder. With a few computer commands, anyone can copy electronic information and transmit it quickly and easily. The challenge facing architects is how to ensure payment for the use of their work when digital technology has made copying and distribution so fast and easy.

The Right to Control Copying

Copyright in Canada is set out in the federal *Copyright Act*. Because the *Copyright Act* is a federal statute, it applies throughout Canada. Under copyright law, unless there is permission or a licence from the owner, generally speaking, it is illegal to copy, reproduce, publish, or transmit copyright protected material. This is the law in the print world. It is also the law in the digital world. Although that is the law, the application of copyright in a digital environment is not always easy.

Why is Copyright Important to Architectural Practice in a Digital Environment?

Architects must be concerned about people using their work without permission or paying the appropriate fee. The legal term for unauthorized use is "copyright infringement." Digital technology has made copyright infringement a whole lot easier. People have long been able to photocopy plans and texts, tape-recorded music and television shows. Such "leakage", as copyright lawyers call it, has always existed. However, with digital technology, this leakage threatens to turn into a flood. For example, plans digitized into a computer file can be copied and distributed by e-mail in minutes, a dozen, or even a hundred times. Digital technology makes unauthorized copying of material protected by copyright fast and very easy. This is why knowing how the copyright law protects architects is especially important in a digital environment.

Architectural Works Are Protected by Copyright

The Copyright Act protects architectural works in a category of material called "artistic works." Artistic works are defined to include drawings, charts, plans, photographs, works of artistic craftsmanship (such as models) and architectural works. An "architectural work" is defined to mean "any building or structure or any model of a building or structure." As a result, the building is protected by copyright, as well as the various drawings, sketches, designs and models produced as part of the project.

Architects Own the Copyright in their Works

Under the *Copyright Act* an architect is an "author." Under a general rule, the first owner of copyright in a work is its author. Therefore, architects, as authors of plans, drawings, specifications, addenda and so on, are the owners of the copyright in those artistic works. There are a number of special ownership rules, one of which provides that where an author is employed, and the work is made as part of that employment, the "employer" instead of the "author" is the first owner of the copyright. The rules on ownership can be changed by agreement. For example an architect can agree that copyright will belong to the client. The copyright law requires that the agreement, or contract, be in writing.

Note: When an architectural practice engages an independent contractor (sometimes erroneously referred to as a "contract employee"), there should be agreement on the issue of copyright ownership in order to avoid future problems.

Owning a Copy Does Not Include Owning Copyright

Ownership of a physical object does not include ownership of copyright. For example, ownership of a set of plans does not mean that a client also owns the copyright in them. The plans can be owned by the client, but activities restricted by the copyright law (such as making a copy, posting the plans on a web site, or constructing a second building from the plans) still apply. The client is entitled to the use of the "instruments of service" (usually the drawings and specifications), but only on the condition that the client has paid for the services represented by the instruments of service, and then only for the purpose intended. Just because the client physically owns the plans does not mean the plans can be copied, used on a web site or used to construct another building. The legitimate needs of clients should be dealt with in a written agreement with the agreed-upon uses of the copyright protected material clearly defined.

How long does Copyright Last?

Ownership of physical property, such as a car or piece of land, continues until the property is sold, consumed, or given away. Copyright is different because it ends after periods of time set in the *Copyright Act*. Under a general rule, copyright subsists for the life of the author of the work, the remainder of the calendar year in which the author dies, plus an additional 50 years. Where an architectural work has more than one author, copyright subsists for the life of the author who dies last, for the remainder of the calendar year of that author's death, plus an additional 50 years. When copyright ends a work is said to fall into the "public domain". Everyone is free to use a public domain work without permission or paying royalties (including digital use).

What Rights Does a Copyright Owner Have?

The copyright law provides a number of legal rights. These rights permit copyright owners to control when, where, by whom and at what cost their creations can be used. There are two different kinds of rights: moral rights and economic rights.

Right of Reproduction

One of the most important economic rights an architect has under the *Copyright Act* is the sole and exclusive right to reproduce a work, or a substantial part of it, in any material form. An example of how this applies in an on-line setting is downloading. In copyright terms, downloading is making a copy. Downloaded copies are reproductions under the copyright law and require the authorization of the copyright owner. As the author, an architect has the exclusive legal right to copy specifications, drawings and addenda and is the only person who can authorize anyone else to do so.

Paper, electronic, or three dimensional models are copies in material form. Although unauthorized use is not a new concern, the ease of copying electronic documents is a major issue for architects in the digital context. However, if someone wants to use drawings without authorization or payment, they will do so whether the copy is in paper or digital form.

Right of Publication

Another right provided is the exclusive right to publish the work for the first time. The decision of whether and when to publish plans belongs to the copyright owner.

Right of Adaptation

Another right is to adapt a work from one form to another. An example which clearly illustrates this right is adapting a novel to make a movie. Architects, like novelists, have the legal right to control adaptations of their works from one form to another. For example, an architect has the right to control adaptation of plans or drawings to serve a new purpose.

Right of Electronic Distribution

Architects also have the right to control communication of their work to the public by telecommunication. This right is important for anyone using on-line distribution. When a work is transmitted on-line what happens in copyright terms is a communication to the public by telecommunication. Only the copyright owner has the legal right to communicate to the public by telecommunication, or to authorize anyone else to do so. If anyone wants to transmit an architectural work on-line, such as a client or a contractor, then they have to get the authorization of the copyright owner. For example, virtual or electronic plans rooms cannot operate unless the authorization of the copyright owner in the electronic documents is first obtained. If authorization is not obtained, an infringement will occur. When an architect owns the copyright, he controls the electronic use.

What is Copyright Infringement?

"Infringement" is the legal word for breach or violation of the rules in the copyright law. Infringement occurs when someone, without permission, does something only the copyright owner has the right to do, or to authorize. For example, only the copyright owner has the right to make a copy. When someone makes a copy, they infringe copyright because they do something only the copyright owner has a right to do.

There are consequences for breaking any law. For example, the consequence for jay walking is a ticket and for murder a jail term. Infringement of copyright law is no different. The most common consequence for copyright infringement is a court order that money be paid by a defendant as compensation for damages caused by an unauthorized use of a copyright work. There are many cases where architects have been awarded money to compensate them for the financial loss caused by the unauthorized use of their work. Another common consequence is an injunction (court order to stop infringing).

Copyright Notices

Copyright protection in Canada is automatic. Under the *Copyright Act* there is no need to register copyright in order to be protected, although there is a voluntary registration system administered by the Canadian Intellectual Property Office at Industry Canada. A copyright registration certificate entitles the registrant to presumptions on ownership and authorship which are useful in enforcing copyright against third parties.

In Canada, it is not necessary to mark a work with a notice of copyright in order for it to be protected. However, a work must be marked for it to be protected in some other countries. An international agreement called the Universal Copyright Convention provides for marking with a small "c" in a circle, the name of the copyright owner and the year of first publication. An example is "© John Doe Architect, 2001." Even though marking is not mandatory in Canada, it serves as a reminder to others that copyright exists in a work and gives the name of the copyright owner.

Trademarks and Patents

There are five types of intellectual property: copyright; patents; trademarks; industrial designs; and integrated circuit topographies. A trade mark is a word, a symbol, a design, or a combination of these, which traders use to distinguish their wares and services from those of their competitors. Trademarks are owned by, and come to represent not only actual wares or services but the reputation of the trader. Architects often have trademark rights since almost everyone that operates a business uses a trademark of one kind or another to identify his or her wares or services.

A patent gives an inventor the right to exclude others from making, selling or using an invention for a maximum of 20 years. In exchange, the inventor provides a full description of the invention so that all Canadians can benefit from the advance represented by the invention. As a general rule, patent protection is not relevant to architectural practice.

Some Practical Suggestions[1]

The practical enforcement of copyright in an online environment has many aspects. It involves the control of files and material sent via e-mail, removable media, and by downloading from host sites on the Internet. These are the general methods of transferring files between individuals, and usually lack any sort of control at either the base level, or in the distribution itself.

While it is important to explore and implement some type of copyright strategy, it is equally important to note that the single largest contributing factor to copyright infringement is general public attitude. The public's attitude toward the digital world, and particularly the Internet, is that it is essentially a "free" domain. Great resistance is offered to any person or group attempting to institute a pay-for-use system on the Internet. The recent Napster case is an example. Acquiring easily copied digital material is simply not perceived as "theft" by a vast majority of Internet users.

In this environment, control over copyright material becomes the responsibility of the copyright owner. Copyright laws exist, but unless infringement is blatant or causes enormous economic harm, as in the Napster case, enforcement will generally not occur. Infringement is rarely wildly obvious or causes the millions of dollars in economic harm that occurred in the Napster case.

From a practical perspective, there are several technological ways to minimize copyright infringement:

- a digital drawing can be bound or its layers grouped into a single layer which minimizes the usefulness of the drawing file.
- use of software, such as Adobe Acrobat, creates a graphic file that is printable and viewable, but has no direct CAD usefulness.
- files or material available for download from a web, ftp, or other accessible public site should be password-protected.
- include text in an e-mail message, with any removable media, and within the file itself, warning the user that the content of the file is protected by copyright and that copying is prohibited unless permission is obtained.

This list is by no means comprehensive, but outlines some simple steps. None of these steps wholly, or even in large part, will stop copyright infringement. However, awareness of the fact of infringement may, in the long run, prove to be of the greatest value to architects in protecting their work.

[1] Liberally adapted with permission from an article by Chris Gowling, Kasian Kennedy Architecture Interior Design and Planning.

The following documents and forms are attached:

Licence Agreement – an agreement form to be completed and used when the architect intends to permit limited use of his or her documents. The architect should ensure appropriate compensation for such a licence.

Copyright Notice –sample wording to be applied to all electronic documents.

Disclaimer –sample wording to be applied to all electronic documents.

The purpose of these forms is to assist the architect in the overall control and management of electronic documents and in the protection of the architect's copyright.

Logo or Name of Architectural Practice

Licence Agreement

Between:

_____ (the Architect)

and

_____ (the User)

WHEREAS the User has requested from the Architect, and the Architect has agreed to supply to the User, _____

_____

_____

(specify electronic document(s) e.g. specifications, drawings and addenda) **hereafter the "electronic documents."**

Therefore, the Architect and the User agree as follows:

1. The Architect retains all rights of ownership, including copyright, in the electronic documents.

2. The User agrees not to forward to others, transmit, download or reproduce the electronic documents in any format, whether print or electronic, except as expressly permitted under this agreement.

3. The Architect retains physical copies of the materials contained in the electronic documents. Where there is a conflict between the electronic documents and the physical copies, the physical copies shall govern.

4. The User agrees not to modify or alter the electronic documents in any way.

5. The User agrees not to use or reuse the electronic documents in any manner except as expressly permitted by this agreement.

6. The User agrees not to resell, trade, or distribute the electronic documents without cost.

7. The User agrees to review all the documents related to the User's work. If the User does not review a complete set of documents, the User agrees that the risks and consequences of any review are the sole responsibility of the User.

8. The Architect authorizes to User to

   _____

   _____

   (specify uses: eg. to prepare shop drawings, to apply for a building permit, for construction, for tender purposes, to prepare engineering drawings, for renovations or additions etc.)

9. The User agrees that the Architect is not responsible, or liable, in any way for the use of the electronic documents by the User or by anyone receiving the electronic documents from the User, other than the use(s) authorized under this agreement.

10. The Architect expressly disclaims all representations and warranties of any kind, express or implied, in connection with the electronic drawings.

11. Except for any liability which cannot by law be excluded or limited, the Architect shall not be liable to anyone for any direct or indirect damages arising from any errors or omissions, completeness of the electronic documents, misuse of the electronic documents, any errors in its computer system, in the software used therewith, or in the electronic files, or for any lost profits, special or consequential damages for any claim arising out of the use of, or inability to use, the electronic files.

12. The User agrees that use of the electronic documents is at the User's own risk. The User agrees to indemnify and save harmless the Architect, his/her employees, agents and consultants from and against all claims, losses, demands, costs and expenses (including legal fees), damages or recoveries (including any amounts paid in settlement) arising by reason of, caused by, or alleged to be caused by, the User's reliance on the electronic document.

By proceeding to open this file the User agrees to be bound by the terms of this agreement.

Copyright Notice

Copyright in this electronic document belongs to _____. This electronic document may not be forwarded to others, transmitted, downloaded or reproduced in any format, whether print or electronic, without the express, written permission of the copyright owner.

Disclaimer

Use of this electronic document is at the User's own risk. The User shall indemnify and save harmless the Architect, his/her employees, agents and consultants from and against all claims, losses, demands, costs and expenses (including legal fees), damages or recoveries (including any amounts paid in settlement) arising by reason of, caused, or alleged to be caused, by the User's reliance on this electronic document.

Checklist: Internal Review of Drawings

Notes
Refer to the recommended checking procedure on page 9 in Chapter 2.1.9 *Risk Management and Professional Liability*, **which should be followed rigorously.** The primary purpose of this Checklist is **Quality Assurance.** Checking should commence early in the preparation of working drawings and continue throughout their development. Adjust review process to suit the type/size of project.

Refer also to *Checklist: Life Safety Information to Include on Drawings* which deals with Building Code issues, most of which are not repeated here. Life Safety issues should be applied during the design stages and verified early in the review process.

This Checklist is arranged under the titles of the drawings on which the information to be reviewed would normally be placed. Depending on scope/complexity of project, architectural plans may include:

- **Site Plan** *may be divided into separate drawings, each showing selected information*
- **Landscaping Plan** *may be prepared by landscape architect*
- **Exit Analysis Plan(s)** *information may be shown on Key Plan(s) for smaller buildings*
- **Key Plan(s)** *small scale location/reference plan(s) showing each floor level in its entirety; see below*
- **Foundation Plan** *required if building has no basement*
- **Floor Plan(s)** *larger scale general information plans; may be a segment, only, of its floor level; see below*
- **Roof Plan** *see below*
- **Reflected Ceiling Plan(s)** *may be a segment, only, of its floor level; see below*
- **Detailed Plan(s)** *of specific areas, as required*

Refer also to the outline of drawing information found in Chapter 2.3.7 *Construction Documents - Drawings:* follow recommendations on page 7 for Notes, Symbols and Dimensions.

As a general principle, notes and dimensions should be placed in the most significant location in the documents and **not repeated** elsewhere, in order to minimize the risk of unrevised, and probably contradictory, information being left on other drawings.

This Checklist is limited to information which is shown/detailed on drawings. Some cross-references to specifications are provided, where appropriate. Items which are the primary responsibility of the appropriate consulting engineers are noted under relevant drawing titles as a reminder to the architect to review them and verify that there are no conflicts between architectural and engineering drawings.

Comments, clarifications or recommendations are in *italics*
Use of a forward slash (/) signifies *and* or *or*

General

Title Block

- ❑ project name/address *same on all drawings, including drawings prepared by consultants*
- ❑ project number
- ❑ date *same date on all drawings, including drawings prepared by consultants*
- ❑ drawing (sheet) title
- ❑ drawing (sheet) number
- ❑ scale of plot or paper copy *additional graphic scale on any drawings which may be reduced*
- ❑ name or initials of draftsperson
- ❑ north point *on relevant drawings only (Site Plan, Key Plan, Floor Plans, etc)*
  - 'project north' point *if the angle of the building on the site is such that the orientation of a side is not readily apparent*
- ❑ location diagram with portion of building plan cross-hatched showing which part of floor is on sheet *required only if entire building plan, when drawn at appropriate scale, will not fit on one sheet*
- ❑ electronic file name and number/date of plot

Cover Sheet *(optional)*

- ❑ project name
- ❑ project location *small-scale partial map of community with location of project marked/ placed on Site Plan sheet if cover sheet not used*
- ❑ list of drawings *in specifications if cover sheet nor used*
- ❑ **building code data** *placed on Site Plan sheet if cover sheet not used:*
  - project regulated by Part 3, 9 or 11
  - major occupancy
  - building area/gross area *(m^2),including:*
    - existing
    - new
    - total
  - number of storeys:
    - above/below grade
  - height of building *(m)*
  - number of streets/fire access routes
  - building classification
  - sprinkler system
  - standpipe
  - fire alarm
  - high building
  - permitted/actual construction, including:
    - combustible
    - non-combustible
    - both
  - mezzanine(s) area *(m^2)*
  - occupant load based on:
    - m^2 per person
    - design of building
    - *listed by floors, including basement level(s)*
    - *verify total number of occupants for each floor against numbers shown on Key Plan*
  - hazardous substances
  - required fire resistance ratings for:
    - horizontal assemblies
    - supporting members
    - *listed design numbers*
  - spatial separation/construction of exterior walls *details for each side of building, including:*
    - area of exposed building face *(m^2)*
    - limiting distance *(m)*
    - length/height or height/length ratio *(m)*
    - permitted maximum/proposed % of openings
    - fire-resistance rating
    - listed design or description:
      - combustible
      - non-combustible
      - combination
- ❑ **other data** ***as required by Authorities Having Jurisdiction*** *placed on Site Plan sheet if cover sheet not used, including:*
  - calculations of:
    - occupancy
    - number of washroom fixtures required
    - parking
  - seismic design conditions
  - barrier free provisions

Site Plan

Note stating data taken from survey plan/other information provided by client, including surveyor's name and drawing title/number/date and a further note stating source(s) of other information. Check all existing information against sources and ensure same orientation as floor plans

- ❑ site boundaries, including:
  - dimensions/orientation of property lines
  - angles at intersections
- ❑ rights-of-way/easements
- ❑ zoning setback lines and other regulatory conditions
- ❑ benchmark:
  - actual (geodetic) elevation
  - assumed (convenience) elevation
- ❑ borehole locations *borehole logs not shown on drawings, but available in geotechnical report referenced in specifications*
- ❑ legend indicating symbols for existing/ new levels

existing conditions:

- ❑ levels/elevations, including:
  - contour lines/spot elevations
  - top/bottom at abrupt changes in level
  - crown of street(s)/top & bottom of curbs
- ❑ ditches/swales/water courses/ponds
- ❑ catch basins/fire hydrants/maintenance access covers
- ❑ existing buildings/fences/poles/buried services, including:
  - on site
  - adjacent to site
  - existing buildings to be retained
- ❑ paving, including:
  - sidewalks/paved areas/driveways/ curbs/curb cutouts
- ❑ vegetation, including:
  - species/caliper of trees greater than 100mm
  - shrubbery

new construction:

- ❑ building location, including:
  - dimensions from property lines
  - main floor level:
    - geodetic elevation or
    - relative to benchmark
- ❑ differentiation between existing/new for addition/renovation projects by cross-hatching/shading
- ❑ limits of construction
- ❑ location of temporary shoring
- ❑ grading/earthwork:
  - proposed levels/elevations *some of this information may appear on landscape architectural drawings or civil engineering drawings*
- ❑ landscaping, including:
  - existing planting/trees to be removed/retained/protected
  - proposed *new landscaping may be developed later by landscape architect*
  - cross-check against landscape architecture drawings
- ❑ site works, such as:
  - paving:
    - materials
    - dimensions *including unobstructed distance from road/driveway to hydrant/fire department connection*
    - direction of slopes
    - parking areas/roads
    - fire access route(s)
    - extent of light/medium/heavy duty asphalt
    - parking lot layout/painted lines
  - sidewalks/curbs/ramps, including:
    - materials
    - dimensions
    - direction of slopes
  - other construction, with dimensions *as required:*
    - concrete pads for transformers/air conditioning condenser
    - oil tank
    - septic tank/disposal bed
    - well
    - fencing/walls/garbage enclosure/hoarding
  - surface water drainage, such as:
    - ditches/swales/catch basins
    - flood control/containment/confined areas/other environmental protection
    - siltation control devices
- ❑ site servicing information, with dimensions *as required:*
  - *some or all of this may be shown on engineering drawings*
  - system of foundation drainage
  - catch basins/fire hydrants/maintenance access covers
  - utilities and other service connections
  - site lighting
  - pad-mounted transformers
  - cross-check against engineering drawings
- ❑ site details *cross-referenced to other drawings*

Key Plan(s)

Information noted should be shown on Floor Plans if Key Plans not used

- ❑ outline plan of each floor level:
  - differentiation between existing/new for addition/renovation projects *by cross-hatching/shading*
  - location of building cross-sections *cross-referenced to other drawings*
  - all doors with swings *not necessary to show windows*
  - ramps/stairs, with up/down arrows
  - toilet partitions/plumbing fixtures
  - names/identifying numbers of all interior spaces
  - structural grid lines *with reference symbols*
  - primary dimensions:
    - exterior overall
    - column centres
    - verify total of individual dimensions against overall *if complete dimension runs are used*
  - legend/graphic indication of locations

and fire-resistance ratings of all firewalls/fire separations
- number of occupants indicated, assigned to each:
  - exit stair/ramp/exit door to exterior
  - horizontal exit
  - exit door from hazardous rooms/high occupant load areas when occupant load exceeds prescribed number
  - door dividing corridor leading to an exit
  - cross-check total number of occupants for each floor against occupant loads listed in building code data

Demolition Plans *for renovation projects*

- ❑ outline plan of each level showing work to be:
  - demolished
  - underpinned/shored
  - renovated
  - retained
- ❑ specific items numbered/dotted/cross-hatched/shaded *with legend(s) describing work required*

Floor Plans

*Incorporate **all** items noted under Key Plans if Key Plans not used*

- ❑ outline plan of each level: use same orientation for all floor plans and match line *when floor plan divided into segments shown on separate drawing sheets*
- ❑ differentiation between existing/new for addition/renovation projects *by cross-hatching/shading*
- ❑ locations of plan details/interior wall elevations *cross-referenced to other drawings/ ensure all conditions requiring clarification are detailed*
- ❑ structural grid lines *with reference symbols*
- ❑ expansion joints:
  - locations
  - uninterrupted throughout entire building
- ❑ exterior walls/interior partitions/walls:
  - partial-height partitions/walls *differentiated/noted*
- ❑ floor slopes/depressions/trenches
- ❑ location of changes in flooring materials
- ❑ doors with swings/windows/other openings:
  - door sizes/types/fire protection ratings *if door schedule not used*
  - door numbers *cross-referenced to door schedule*
  - cross-check openings against elevations
- ❑ piers/columns
- ❑ dotted footings to walls/piers/columns *on basement or foundation plan*
- ❑ names/identifying numbers of all interior spaces
- ❑ ramps/stairs, with up/down arrows
- ❑ toilet partitions/plumbing fixtures
- ❑ dimensions:
  - overall wall thicknesses *not necessary to dimension each element in walls if wall assembly types identified by reference numbers*
  - partitions
  - locations of windows/doors/other openings

  showing overall dimensions as required
  - verify total of individual dimensions against overall *if complete dimension runs are used*
  - cross-check against other plans/details at different scales *refer also to Notes*
  - cabinetwork *if interior elevations not used*
- ❑ wall components delineated:
  - masonry wythes/cavity
  - insulated metal wall systems
  - EIFS/drywall/cladding to stud walls
  - *no cross-hatching of each element if wall assembly types identified by reference numbers*
- ❑ wall assembly types identified by reference numbers:
  - *W1, W2, etc. for exterior walls; P1, P2, etc. for interior partitions*
  - schedule giving thickness/material of each component of each wall type *preferably on same drawing*
  - cross-check that terminology/abbreviations used for materials same as in specifications
  - every wall identified by appropriate reference number
- ❑ outlines of cabinetwork
- ❑ other work:
  - concrete bases for mechanical/electrical equipment
  - manufactured items:
    - panel folding doors
    - washroom accessories
    - prefabricated shelving
- ❑ engineer-designed items:
  - dimensions *only to items requiring precise locations*
  - structural:
    - columns

- mechanical:
  - vertical ducts/duct shafts/pipe spaces
  - built-in/semi-recessed/surface mounted components
  - plumbing fixtures
  - piping requiring chases
  - major equipment
- electrical:
  - panels
  - other built-in/semi-recessed/surface-mounted components
  - major equipment
- cross-check against engineering drawings

Roof Plan

Same orientation as floor plans and match line when roof plan divided into segments shown on separate drawing sheets

- ❑ differentiation between existing/new for addition/renovation projects *by cross-hatching/shading*
- ❑ locations of plan details *cross-referenced to other drawings*
  - *ensure all conditions requiring clarification are detailed*
- ❑ structural grid lines *with reference symbols*
- ❑ type of roofing:
  - roof assembly types identified by reference numbers: *R1, R2, etc.*
  - schedule giving thickness/material of each component of each type *preferably on same drawing*
  - cross-check that terminology/abbreviations used for materials same as in specifications
- ❑ slope directions
- ❑ drains/sumps/scuppers/gutters
- ❑ roof pads/curbs/anchors/ladders/guard rails
- ❑ curbs at roof access doors
- ❑ parapets/low rise walls/screens
- ❑ access hatches/skylights
- ❑ vents/chimneys
- ❑ roof walkways
- ❑ roof-mounted mechanical/electrical equipment
- ❑ dimensions only to items requiring precise locations
- ❑ cross-check against engineering drawings

Reflected Ceiling Plans

Same orientation as floor plans and verify match with most recent floor plans and match line when ceiling plans divided into segments shown on separate drawing sheets

- ❑ ceiling types *cross-referenced to finish schedule, using same terminology/abbreviations*
- ❑ ceiling/bulkhead levels
- ❑ layout/alignment of ceiling suspension grid(s)
- ❑ bulkheads:
  - cross-referenced to detail drawings *preferably located on same sheet*
- ❑ light fixtures:
  - surface-mounted
  - recessed
- ❑ supply diffusers
- ❑ return air grilles
- ❑ detectors:
  - heat/smoke
  - carbon monoxide
- ❑ sprinkler heads
- ❑ other equipment such as speakers, etc.
- ❑ legend(s) *showing symbols/notes used*
- ❑ cross-check against mechanical/electrical drawings

Building Sections

Each section identified by reference number verify cross-references to location drawings

- ❑ all building components that intersect with section:
  - *interior elevations showing cabinetwork if not detailed/shown elsewhere*
- ❑ match line *when sections divided into segments*
- ❑ differentiation between existing/new for addition/renovation projects *by cross-hatching/shading*
- ❑ locations of wall details *cross-referenced to other drawings*
  - *ensure all conditions requiring clarification are detailed*
- ❑ verify that window/door openings match elevations
- ❑ levels/elevations:
  - finish floor *for each floor level*
  - roof bearing at walls
  - grade at building
  - bottom of footings
- ❑ structural grid lines *with reference symbols*
- ❑ vertical dimensions:
  - floor to floor
  - floor to roof *taken to same point as shown on large-scale wall details*
  - floor to top of parapets
  - window openings
  - interior openings/glazed screens

- ❑ legend/graphic indication of locations and fire-resistance ratings of all firewalls/ fire separations:
  - firewalls continuous from ground to/ through roof:
    - may terminate at underside of reinforced concrete roof slab
    - parapet height as required by fire-resistance rating of firewall
  - wall fire separations continuous elements from floor up through ceiling space to underside of structure above including exceptions where fire-resistance rating waived, but walls still required to be constructed as fire separations (when separation falls under steel joists/beams, continuity maintained by rated enclosure of joists/sprayed fireproofing on beams *or other means)*
  - floor/roof assembly fire separations
- ❑ wall/roof assembly types identified by reference numbers *cross-referenced to drawings where schedules placed*
- ❑ structural:
  - footings
  - special foundations *usually shown only partially*
  - joists/beams/lintels/rafters/roof trusses
  - in section
  - in elevation *if beyond*
- ❑ heating/ventilating/air conditioning:
  - main horizontal ducts
  - major equipment: in elevation *if beyond*
- ❑ cross-check against engineering drawings

Elevations

If building form is complex, parts of elevation identified by letter or number on location diagram in title block and match line when elevations divided into segments

- ❑ all building faces:
  - below-grade foundation walls/ footings *dotted*
  - line of grade at building face
- ❑ differentiation between existing/new for addition/renovation projects
- ❑ locations of:
  - wall details
  - plan details - ***only*** *if required to augment/clarify notations on Key Plan/Floor Plans/Building Sections*
- ❑ *cross-referenced to other drawings*
  - *ensure all conditions requiring clarification are detailed*
- ❑ verify that window/door openings match building sections
- ❑ openings/penetrations:
  - doors/windows/grilles/vents/fire fighting access panels
  - dimensions to intermediate mullions for door frames/windows *or*
  - reference numbers for each door frame/window type *cross-referenced to drawings where large-scale elevations placed*
- ❑ attachments:
  - light fixtures/receptacles/siamese connections/signage/downspouts/ flagpoles/etc.
- ❑ structural grid lines *with reference symbols*
- ❑ locations of interior/hidden levels:
  - floors
  - finish floor level/elevation *for each floor level*
  - flat roofs behind parapets
- ❑ vertical dimensions:
  - to doors/windows/other important items requiring location
  - floor to floor or floor to roof *when not shown on Building Sections*
- ❑ exterior construction materials:
  - graphically/notations -cross-check that terminology/abbreviations used for materials same as in specifications
  - masonry control joints
  - expansion joints
- ❑ roof-mounted mechanical equipment *which affects appearance of building*
- ❑ cross-check against engineering drawings

Details

wall sections

- ❑ each section identified by reference number/scale *verify cross-references to location drawings*
- ❑ all building components that intersect with section shown:
  - cross-hatching/symbols to indicate materials, plus notations, including location/material of air/vapour barriers or
  - wall/roof assembly types identified by reference numbers *cross-referenced to drawings where schedules placed*
  - section continuous from footing to roof
  - typical window or door condition
    - verify that window/door openings match building sections
  - fire stops in concealed spaces

- backfill line, including foundation drainage/backfill layers
- special drainage

❑ column line - dimensioned to wall face(s)
❑ vertical dimensions
❑ structural:
- reinforcing in footings/anchor bolts *when not shown on structural drawings*
- joists/beams/lintels/rafters/roof trusses

❑ cross-check against engineering drawings

large-scale details of building envelope/assembly conditions

ensure all conditions requiring clarification are detailed

❑ vertical/horizontal
❑ each detail identified by reference number/scale *verify cross-references to location drawings*
❑ vertical section details:
- wall/floor intersections
- window sills
- window/door heads
- curtain wall
- wall/roof intersections
- roof details:
  - curbs/expansion joints
  - skylights

❑ horizontal section details:
- corners
- intersections with columns/partitions
- window/door jambs

❑ notations:
- levels/elevations, including:
  - floor/roof
  - structural bearing for joists/beams
- wall/roof assembly types identified by reference numbers *cross-referenced to drawings where schedules placed*
- assemblies not covered by reference numbers *fully noted*
- cross-check that terminology/abbreviations used for materials same as in specifications
- through-wall flashings
- air/vapour barriers:
  - continuity
  - laps/seals to adjoining barrier materials/assemblies
- all dimensions *not already shown on Plans/Building Sections/Elevations:*
  - vertical/horizontal
  - key measurement points identified *for cross-reference to location drawings*

detailed floor plans/associated interior elevations

Ensure all areas requiring clarification are detailed. Provide plan blow-ups of complex areas.

❑ verify accuracy against most recent floor plans
❑ each plan/detail identified by reference number/scale *verify cross-references to location drawings*
❑ detailed dimensions
- no duplication of information on floor plans

❑ materials/accessories:
- special floor finish layouts/patterns/details
- custom-fabricated items
- manufactured specialties
- cross-check that terminology/abbreviations used for materials same as in specifications

❑ cross-referenced to detail drawings for:
- wall elevations *preferably on same sheet for ease of reference when specific to detailed plan*
- installation details
- custom-fabricated items

interior elevations

Ensure all areas requiring clarification are detailed.

❑ each elevation/detail identified by reference number/scale *verify cross-references to location drawings*
❑ interior wall elevations:
- elevations of cabinetwork
  - locations of sections *cross-referenced to cabinetwork details*
- other wall-mounted items
- glazed screens/interior windows/openings
- special equipment
- panel folding doors/walls
- paneling
- grilles/louvres/thermostats/other mechanical items
- switches/receptacles/electrical panels
- *cross-referenced to details*

❑ dimensions:
- horizontal dimensions to cabinetwork
- vertical dimensions to locate wall-mounted items
- locations/areas for wall finishes/paneling

❑ cross-check that terminology/abbreviations used for materials same as in schedules/specifications
❑ cross-check against mechanical/electrical drawings

window/door details

Ensure all areas requiring clarification are detailed.

- ❑ each elevation/detail identified by reference number/scale *verify cross-references to location drawings/details*
- ❑ dimensioned elevation of each type of:
  - window
  - aluminum entrance/sidelight/storefront
  - door *including glazing/grilles as required*
  - hollow metal door frame/screen
  - cross-check overall dimensions against dimensions on Plans/Building Sections/Elevations
  - *cross-referenced to large-scale details*
- ❑ notations:
  - glazing:
    - *same terminology/abbreviations as specifications*
    - glass type
    - glazing components
  - frame materials
  - grilles
- ❑ large-scale details, including:
  - window frames/opening vents
  - curtain wall
  - aluminum entrances/sidelights/screens
  - hollow metal frames/screens
  - special fabrications
  - cross-referenced to elevations

stair/ramp details

ensure are all conditions requiring clarification are detailed

plans:

- ❑ stairs/ramps:
  - widths/lengths
  - landings/clearances to doors
  - slip-resistant surfaces
  - demarcation by colour/pattern in floor surfaces:
    - leading edge of treads/landings
    - beginning and end of ramps
- ❑ handrails:
  - continuous on both sides of stairway *including landings when required*
  - termination:
    - no obstruction to pedestrian travel
    - not hazardous
    - at least one handrail extended horizontally beyond top and bottom of stairway/ramp

cross-referenced to large-scale details

sections:

- ❑ stairs:
  - leading edge of treads radiused/beveled
  - uniform run/rise in any one flight
  - no significant alteration in run/rise in successive flights
  - maximum vertical rise of flights between floors/landings not exceeded
  - minimum headroom clearance maintained
  - *check floor to floor heights against Building Sections*
- ❑ ramps:
  - slopes indicated
  - landings/level areas adjacent to doors
- ❑ guards:
  - height
  - limited opening sizes through guards
  - designed to prevent climbing
  - *cross-referenced to large-scale details*
- ❑ dimensions:
  - tread/riser
  - horizontal/vertical
  - landings
  - height of handrails/guards
- ❑ large-scale details:
  - typical tread/riser
  - custom-fabricated items
  - special conditions
  - *cross-referenced to plans/sections*

elevators/escalators

Ensure all areas requiring clarification are detailed

- ❑ cross-check against specified manufacturers' dimensions/details *Note: it is not recommended to reproduce manufacturers' proprietary details*
- ❑ plans:
- ❑ elevator:
  - pit(s)
  - shaft(s) showing door openings
- ❑ escalators:
  - floor openings
- ❑ elevator machine room:
  - shaft(s) below dotted *cross-referenced to details*

sections:

- ❑ vertical section(s) through elevator shaft(s)/escalators showing:
  - pit
  - all floors
  - elevator machine room
  - *check floor to floor heights against Building Sections*

dimensions:

- ❑ plan location(s) *relative to structural grid lines*
- ❑ pit:
  - depth
  - width/length
- ❑ shaft:
  - width/length
  - openings
  - floor to floor
  - top landing to machine room floor
- ❑ machine room:
  - width/length
  - placement relative to shaft(s)
- ❑ escalator floor openings

details:

- ❑ access ladders/stairs
- ❑ custom fabricated items
- ❑ *cross-referenced to plans/sections*

cabinetwork

Ensure all areas requiring clarification are detailed

- ❑ each detail identified by reference number/scale *verify cross-references to interior elevation drawings*
- ❑ cross-check services/spaces for Owner-provided appliances/equipment
- ❑ cross-check against mechanical/electrical drawings:
  - sinks/fittings
  - water lines/laboratory services
  - drains/vents/grease interceptors
  - switches/receptacles/turrets
  - access panels

detail sections for each cabinet condition

dimensions:

- ❑ vertical/horizontal
- ❑ splashback height
- ❑ toe space height/depth
- ❑ countertop overhang

notations:

- ❑ generic *sufficient to identify materials: specifications provide detailed descriptions*
- ❑ cross-check that terminology/abbreviations used for materials same as in specifications
- ❑ splashback returns
- ❑ adjustable shelves
- ❑ special items

millwork/miscellaneous details

Ensure all areas requiring clarification are detailed

- ❑ each detail identified by reference number/scale *verify cross-references to interior elevation/other drawings*
- ❑ large-scale details of all custom-fabricated items
- ❑ fully dimensioned
- ❑ generic notations *sufficient to identify materials: specifications provide detailed descriptions*
  - cross-check that terminology/abbreviations used for materials same as in specifications

Schedules

doors & frames

Include every door in Schedule

- ❑ *verify cross-references to Floor Plans*
- ❑ cross-check that terminology/abbreviations used for materials same as in specifications

verify scheduled description for each door:

- ❑ location
- ❑ swing (hand)
- ❑ dimensions
- ❑ material
- ❑ glazing material *same terminology as specifications*
- ❑ fire protection rating:
  - *check against fire separations on Key Plan/Floor Plans*
- ❑ frame:
  - material
  - wall thickness
  - *cross-referenced to door frame elevations/details*
- ❑ hardware sets
- ❑ special hardware requirements:
  - closers
  - panic devices
  - electromagnetic hold-open devices
  - electromagnetic locking devices
  - automatic openers
  - weatherstripping

room finishes

Include every surface in every room in Schedule

- ❑ *verify cross-references to Floor Plans*
- ❑ verify scheduled description for each room:
  - floors: material
  - base: material
  - each side of room listed separately
  - wall material
  - finish

notations in remarks column for:

- alcoves
- closets
- columns
- unusual configurations

- ceilings:
  - material
  - height *check against Building Sections*
- remarks
- legend *explaining abbreviations used*
  - cross-check that terminology/abbreviations used for materials same as in specifications

Structural

- *same orientation as floor plans*
- verify match with most recent architectural floor plans:
  - same match lines as architectural floor plans *when used*
  - structural grid lines
  - expansion joints
- demolition plans for renovation projects showing work to be:
  - demolished
  - underpinned/shored
  - renovated
  - retained
- cross-check dimensions of concrete footings/walls/slabs/beams against Floor Plans/Sections
- floors:
  - depressions/trenches
  - slopes
  - sawcuts
  - special finishes
- columns:
  - orientation of rectangular/H sections
  - dimensions consistent with space available
- roofs designed to support weight of retained water when restrictor roof drains specified
- exposed structural steel:
  - continuous welds
  - welds ground
- miscellaneous structural items:
  - anchors:
    - provision for masonry anchorage to steel columns
    - lateral support to masonry walls
  - additional framing to support roof-mounted mechanical equipment
  - shelf angles
  - loose lintels *usually scheduled*
  - reinforced concrete block masonry:
    - piers
    - bond beams
    - walls
- cross-check roof slopes against Building Sections
- check opening sizes/associated framing against architectural/mechanical/electrical drawings, including:
  - through floors/roof:
    - exit shafts
    - duct shafts
    - elevator/escalator shafts
    - skylights
    - hatches
  - through walls:
    - large architectural openings
    - air supply/exhaust louvres
    - ducts through poured concrete walls
- cross-check clearances available in ceiling spaces between beams/suspended ceilings against mechanical/electrical items:
  - ducts
  - heat pumps/VAV units/fan coil units/etc.
  - sprinkler lines
  - roof drains
  - recessed light fixtures
  - cable trays
  - duct banks
- ensure there are no general notes on drawings duplicating information in specifications

Mechanical

- *same orientation as floor plans*
- verify match with most recent architectural floor plans:
  - names/identifying numbers of all interior spaces
  - same match lines as architectural floor plans *when used*
- cross-check locations of mechanical site work items against Site Plan:
  - foundation drainage
  - catch basins/fire hydrants/maintenance access covers
  - utilities and other service connections
- demolition plans for renovation projects showing work to be:
  - demolished
  - renovated
  - retained
- cross-check locations of mechanical items against Floor Plans/Building Sections/ interior elevations:
  - fire dampers in all ducts penetrating fire separations

- no duct penetrations through exit stairway/ramp walls
- vertical ducts/duct shafts/pipe spaces
- built-in/semi-recessed/surface mounted components:
  - no recessed items in fire separations
- floor drains
- hose bibbs
- plumbing fixtures/fixture types
- major equipment
- standpipes:
  - hose connections on each storey of building
  - fire department connection
- fire hose cabinets:
  - fully opened door does not obstruct required exit width
- portable fire extinguishers

❑ cross-check all roof-mounted items against Roof Plan:
- drains/scuppers/gutters:
  - check against structural for conflicts between roof drains/beams
- vents/chimneys
- equipment

❑ cross-check clearances available in ceiling spaces between structural beams/ceiling heights against:
- ducts
- worst-case situations:
  - duct crossings
  - allowances for duct insulation/ fireproofing on steel beams/clearances for support framing for wide ducts
  - beams at ceiling level *for example, folding wall support beam*
  - horizontal piping
  - recessed light fixtures
- heat pumps/VAV units/fan coil units/etc.
- sprinkler lines
- roof drains
- electrical items

❑ cross-check all ceiling-mounted items against Reflected Ceiling Plans:
- skylight openings
- supply diffusers
- return air grilles
- fire stop flaps in rated membrane ceiling assemblies
- detectors:
  - heat/smoke
  - carbon monoxide
- sprinkler heads

❑ cross-check against structural drawings for conflicts between:
- drain inverts/footings
- columns within plumbing chases/horizontal piping/vents
- roof drains/beams/columns

❑ cross-check against electrical drawings/schedules for horsepower ratings/voltage/phase for major equipment items

❑ ensure there are no general notes on drawings duplicating information in specifications

Electrical

❑ *same orientation as floor plans*

❑ verify match with most recent architectural floor plans:
- names/identifying numbers of all interior spaces
- same match lines as architectural floor plans *when used*

❑ cross-check locations of electrical site work items against Site Plan:
- underground utilities
- lighting poles
- pad-mounted transformers

❑ demolition plans for renovation projects showing work to be:
- demolished
- renovated
- retained

❑ cross-check locations of electrical items against Floor Plans/Elevations/ interior elevations:
- no penetrations through exit stairway/ramp walls
- panels
- central alarm and control facility
- built-in/semi-recessed/surface-mounted components:
  - no recessed items in fire separations
- interior/exterior wall-mounted light fixtures/illuminated signage/ switches/receptacles:
  - door swings/switch locations
  - cabinetwork/receptacle mounting height
- manual pull stations
- major equipment

❑ cross-check roof-mounted electrical equipment against Roof Plan

❑ cross-check clearances available in ceiling spaces between structural beams/ceiling heights against:
- recessed fixtures

- cable trays
- duct banks
- mechanical items

❑ cross-check all ceiling-mounted items against Reflected Ceiling Plans:
- skylight openings
- mechanical items
- light fixtures:
  - surface-mounted
  - recessed
  - check fixture types against electrical specifications
  - exit
- detectors:
  - heat/smoke
  - carbon monoxide
- exit signs:
  - visible from exit approach
  - over exit doors
  - additional signs to indicate direction of egress
- alarm signals:
  - audible devices located to be clearly audible throughout floor area served
  - visual devices located to be visible throughout floor area served

❑ cross-check against mechanical drawings/ schedules for horsepower ratings/voltage/ phase for major equipment items

❑ ensure there are no general notes on drawings duplicating information in specifications

Checklist: Life Safety Information to Include on Drawings

Notes
Life safety information in this Checklist is arranged under the titles of the drawings on which the information would normally be placed. Basic information required to determine type of construction, fire-resistance ratings and fire separations is listed under **General**. The arrangement of information is suggested only; the architect should modify where information is placed to suit the requirements of documenting the particular project. This Checklist is limited to information which is shown or detailed on drawings; it does not include items which are normally included in the specifications.

Some items are the primary responsibility of the appropriate consulting engineers. These items are noted under relevant drawing titles as a reminder to the architect to coordinate and verify that the information is shown on relevant engineering drawings.

Comments, clarifications or recommendations are *in italics*.
Use of a forward slash (/) signifies *and* or *or*
"as prescribed" indicates that relevant/more detailed requirements should be reviewed in the applicable Building Code or other regulations of Authorities Having Jurisdiction

General

building fire safety

prescribed combustible/non-combustible construction and fire-resistance ratings/fire separations for floor/roof/supporting assemblies, based on:

- ❑ occupancy classification
- ❑ building area
- ❑ number of storeys
- ❑ number of facing streets -number of streets determined *as prescribed*
- ❑ whether building sprinklered/unsprinklered:
  - exceptions for roof construction for sprinklered buildings *as prescribed*:
    - fire-resistance rating waived
    - heavy timber roof/supporting structure permitted
  - requirements for buildings containing multiple major occupancies based on:
  - building area/height of entire building
  - most restricted major occupancy
  - *some combinations of occupancies prohibited*
  - exception if floor area occupied by a major occupancy less than prescribed % of storey
- ❑ separations between major occupancies *as prescribed* when:
  - adjacent horizontally
  - one entirely above another
- ❑ basements:
  - floor assembly above basement designed as fire separation *as prescribed*
  - basement storage garages:
    - sprinklered, except for open-air storeys
    - may be considered as a separate building when:
      - garage sprinklered
      - walls/floor and roof above designed as fire separations
      - wall openings without closures separated from storey above
- ❑ exterior balconies:
  - areas/dimensions *as prescribed*
  - construction same fire-resistance rating as required for occupancy classification of building
  - fire protection not required on steel members outside exterior wall

building code data

may be placed on Site Plan or cover sheet:
[Ontario architects refer to OAA Practice Bulletin A.9, April 2002]

- ❑ project regulated by Part 3, 9 or 11
- ❑ major occupancy
- ❑ building area/gross area *(m^2)*:
  - existing
  - new
  - total
- ❑ number of storeys: above/below grade
- ❑ height of building *(m)*
- ❑ number of streets/fire access routes
- ❑ building classification
- ❑ sprinkler system as proposed
- ❑ standpipe *as required*
- ❑ fire alarm *as required*
- ❑ high building
- ❑ permitted/actual construction:
  - combustible
  - non-combustible
  - both
- ❑ mezzanine(s) area *(m^2)*
- ❑ occupant load based on:
  - m^2 per person
  - design of building
  - *list by floors, including basement level(s)*
- ❑ hazardous substances
- ❑ required fire resistance ratings
  - horizontal assemblies
  - supporting members
  - *indicate listed design numbers*
- ❑ spatial separation/construction of exterior walls
  provide details for each side of building, including:
  - area of exposed building face *(m^2)*
  - limiting distance *(m)*
  - length/height or height/length ratio *(m)*
  - permitted maximum/proposed % of openings
  - fire-resistance rating
  - listed design or description
    - combustible
    - non-combustible
    - combination

Site Plan

- ❑ access for fire fighting: access route(s) to principal entrance/each building face having access openings for fire fighting:
  - within prescribed unobstructed distance from hydrant/fire department connection
  - *required for buildings over 3 storeys in height or greater than prescribed building area*
- ❑ access route(s) designed to:
  - prescribed clear width/radius/overhead clearance/gradient
  - support expected loading
  - have turnaround facilities
  - be connected with a public thoroughfare
- ❑ water supply:
  - hydrants within prescribed distance from every side of building required to face a street
  - provision of adequate supplemental water supply for fire fighting if municipal supply inadequate or unavailable
- ❑ above ground electrical conductors:
  - conform to prescribed clearances from building

Key Plan(s) *recommended*

Show information on Floor Plans if Key Plans not used

Indicate locations and fire-resistance ratings of all:

- ❑ firewalls
- ❑ fire separations required between public corridors and adjacent suites/floor areas, between adjoining suites or *enclosing*:
  - in assembly occupancies:
    - hazardous classrooms: fire separation required for perimeter walls *only* around a group of hazardous classrooms/complementary ancillary rooms *as prescribed*
    - seating areas/stages and ancillary spaces *as prescribed*
    - library book storage rooms not normally accessible to the public
  - in care/detention occupancies:
    - sleeping rooms *as prescribed*: fire separation required for perimeter walls *only* around a group of intercommunicating rooms having fewer than prescribed number of occupants
    - between fire compartments *including those used for horizontal exiting*
    - compartments from which it is impractical to move patients in an emergency
    - contained use areas *as prescribed*
  - in residential occupancies:
    - between suites
      - storage rooms not within suites *as prescribed*

- in industrial occupancies:
  - repair/storage garages *as prescribed*
  - vestibules between storage garages/other occupancies
- in service rooms *as prescribed*:
  - containing fuel-fired appliances/ incinerators/oxygen cylinders
  - mechanical equipment other than fuel fired
  - electrical equipment vaults
  - janitor's/laundry rooms
  - combustible refuse storage
  - elevator machine rooms
- in rooms containing water closets/lavatories
- in vertical service shafts *as prescribed*:
  - exit stairways/elevator/ dumbwaiter shafts
  - linen/refuse chutes: intake/ discharge rooms
  - separations at top/bottom of shafts

❑ exceptions in sprinklered buildings for certain occupancy classifications *for example:* fire-resistance rating of walls enclosing corridors used by the public as access to exit may be waived in an assembly occupancy *however walls are still required to be constructed as fire separations*

❑ indicate number of occupants assigned to each:
- exit stair/ramp/exit door to exterior
- horizontal exit
- exit door from hazardous classrooms/high occupant load areas when occupant load exceeds prescribed number
- door dividing corridor leading to an exit
- *Add up number of occupants for each floor and transfer total to occupant load line in building code data*

Floor Plans

basements/floors below grade

❑ fire fighting access:
- to unsprinklered basements having greater than prescribed horizontal dimension:
  - from at least one street
  - by doors/windows/other means, dimensions *as prescribed* or
  - interior stairway immediately accessible from outdoors

❑ fire separations/firewalls:
- openings protected with closures having prescribed fire protection rating:
  - *refer also to notes under* ***floors above grade*** *below*
- unsprinklered basements compartmentalized at prescribed maximum areas
- firewall at floor above not required to continue into basement storage garage below

❑ fire stops in unsprinklered crawl spaces: compartmentalized at prescribed maximum areas/dimensions

❑ storeys extending more than one storey below ground:
- sprinklered
- floor assemblies constructed as fire separations with fire-resistance rating *as prescribed*
- exceptions for residential occupancies *as prescribed*

❑ underground walkways connecting buildings:
- non-combustible construction
- sprinklered
- separated from buildings by fire separations with fire-resistance rating *as prescribed*
- smoke barrier doors spaced along walkway *as prescribed*
- travel distance to nearest exit *as prescribed*

❑ industrial occupancies:
- basements used as repair/storage garages:
  - access to stairways/elevators through vestibules
  - continuous curb/guard of prescribed heights around every floor opening/ perimeter where exterior walls omitted
- vapour-tight separation required to separate basements/building services rooms from remainder of building where volatile/explosive materials are stored/ manufactured/handled

floors above grade

❑ fire separations/firewalls:
- openings protected with closures having prescribed fire protection rating:
  - limited to maximum opening sizes/temperature rise *as prescribed*, not more than prescribed maximum % of firewall length
  - fixed wired glass assemblies

- glass block reinforced in each horizontal joint
- no glass block/ fixed wired glass assemblies permitted as closures to openings in firewalls
- enclosure having same fire-resistance rating as surrounding construction forexhaust piping from emergency power systems

❑ exit stairways: used for exiting only:
- except as access to a floor area
- service rooms/spaces or certain ancillary rooms not permitted to open into exit stairway

fire separation:
- same fire-resistance rating as surrounding construction
- without any penetrations except *as prescribed*
- additional requirements for separation between scissor/contiguous stairs:
  - smoke tight
  - no interconnecting doors between contiguous stairs

❑ spatial separation/exposure protection of exterior walls:
- limiting distance *as prescribed* defines:
  - measurement of exposed building face
  - required construction/fire-resistance rating of building face
  - permitted area of unprotected openings
- in unsprinklered buildings requiring prescribed spatial separation:
  - unprotected openings in exterior walls which are parallel or at less than 135° and in different fire compartments
- additional protection required for:
  - exit door/stair/ramp exposed to an opening in an adjacent wall at less than 135° and closer than prescribed distances, horizontally and vertically
  - exit door in one fire compartment exposed to an opening closer than prescribed horizontal distance in exterior wall of another fire compartment when wall is at less than 135°
  - openings protected with closures:
    - fixed wired glass assemblies
    - glass block reinforced in each horizontal joint

❑ covered walkways/vehicular passageways between buildings:
- separated from buildings by fire separations with prescribed ratings
- noncombustible construction when connected to a building of noncombustible construction, *except*:
  - heavy timber construction permitted for ground level walkway when not less than prescribed % of perimeter is open to the outdoors

❑ mezzanines/openings through floor assemblies:
- mezzanines permitted to be open/ unprotected in prescribed occupancies:
  - when conforming to dimensions/ visibility *as prescribed*
- interconnected spaces:
  - conforming to:
    - configuration/fire separations/ sprinklering *as prescribed*
    - additional provisions for exiting/fire separations for portions of interconnected space having floor level more than prescribed distance above grade
  - access to exit not permitted through interconnected space from floor area outside the space
  - requirements waived/modified:
    - when space sprinklered
    - for certain prescribed occupancies
    - when building height not more than prescribed number of storeys

❑ passage of smoke into exit stairshafts/ elevator shafts opening into interconnected space limited:
- when building over prescribed height, by building design
- when interconnected space over prescribed height, by vestibules having:
  - prescribed fire separation/distance between entrance/exit doors
  - mechanical air supply or
  - vent opening to outdoors

❑ passage of smoke from interconnected space through access openings into sleeping rooms in care/treatment occupancies restricted by vestibules having mechanical air supply

❑ unprotected openings permitted for:
- stairs/escalators/inclined moving walks in prescribed occupancies when entire building sprinklered

- vehicular ramps in storage garages
- openings required for a manufacturing process

❑ protection at edges of open floors in industrial buildings:
- toe-board to prevent tools/other objects falling

Means of egress:

❑ *applies also to basements/floors below grade*

❑ minimum two exits required from each occupied floor area *except:*
- floor areas in buildings not more than two storeys in height may be served by one exit provided floor area/travel distance not more than as prescribed

❑ capacity based on occupant load of area served:
- determine required widths of corridors/doorways/ramps/stairs by multiplying occupant load by prescribed factors based on occupancy classification
- no obstruction restricting width to less than prescribed unless unobstructed alternative available nearby/clearly visible

❑ no mirrors permitted in/adjacent to exits that would confuse direction of exit

❑ each suite provided with doorway:
- opening to exterior/public corridor having two opposite directions of exit
  - exceptions for residential occupancies *as prescribed*
- width based on occupant load

❑ at least two egress doorways required from:
- hazardous suites/rooms/classrooms exceeding prescribed area
- suites/rooms/mezzanines:
  - having greater than prescribed occupant load
  - exceeding prescribed area/ travel distance
  - requirements modified for sprinklered spaces
- occupied roof having greater than prescribed occupant load
- rooftop enclosure/service space exceeding prescribed area/ travel distance
- least distance between doorways *as prescribed*
- when more than one exit from a floor area is required, every exit shall contribute not more than half required exit width

❑ means of egress required from every:
- podium/terrace/platform/contained open space/occupied roof/ rooftop enclosure

❑ travel distances to nearest exit not more than prescribed distance based on occupancy classification, measured from:
- any point in floor area along path of travel to exit *or*
- any point in fire compartment to door into adjoining fire compartment or
- egress door into corridor/exterior passageway from suite/room, provided suite/room separated from remainder of floor by a fire separation having:
  - prescribed fire-resistance rating or
  - no fire-resistance rating if building sprinklered
- modifications as permitted for sprinklered buildings

❑ corridors:
- prescribed minimum widths based on occupancy classification:
  - hazardous obstructions into corridor width prohibited
- minimum ceiling height *as prescribed*
- occupancies in corridor *as prescribed*:
  - located so as not to reduce prescribed unobstructed width
  - combined area of all occupancies not more than maximum prescribed % of corridor area
- dead end corridors permitted only *as prescribed*

❑ aisles/seating in assembly occupancies *as prescribed*

❑ exits through lobbies
- one exit may lead through lobby provided:
  - distance of lobby floor above grade/travel distance to outdoors not more than prescribed
  - fire separation maintained between lobby and exit
  - lobby not within an interconnected space *as prescribed*
  - exceptions/modifications for sprinklered buildings *as prescribed*

❑ horizontal exits:
- restrictions *as prescribed*
- sufficient floor area on each side to accommodate occupants of both floor areas calculated *as prescribed*

- ramps used for any difference in level between connected floor areas:
  - slope *as prescribed*
  - stairs not permitted

❑ doors:
- swing on vertical axis
- swing: in direction of egress for:
  - rooms having greater than prescribed occupant load
  - hazardous rooms: except doors from boiler/incinerator rooms swing inward when opening into corridor/any room in assembly occupancy
- pair of doors in a corridor providing access to exit in both directions:
  - swing in opposite directions *with* door on right hand side swinging in direction of travel to exit
- minimum clear opening width for single leaf door/active leaf of multiple doors *as prescribed*
- transparent doors/sidelights:
  - safety/wired glass
  - doors designed/constructed to be clearly identifiable
  - sidelights protected with barriers/guards

❑ sliding doors:
- required to swing on a vertical axis in direction of egress when pressure applied:
  - *not applicable for certain occupancy classifications*

❑ revolving doors:
- collapsible in emergency
- hinged doors with equivalent exiting capacity adjacent
- permitted as exit from ground floor level only
- located not less than prescribed distance from foot of any stairway
- maximum permitted capacity
- exceptions for electrically operated revolving doors *as prescribed*

high buildings:

❑ *additional provisions as required by Building Code/Authorities Having Jurisdiction for buildings over prescribed heights/occupant load*

❑ building designed so that smoke from fire will not reach:
- floor areas above lowest exit storey
- any exit stair
- fire fighters' elevator shaft
- connected building

❑ requirements waived/modified when:
- building sprinklered
- stairways vented to outdoors *as prescribed*
- smoke from below lowest exit storey prevented from moving into upper storeys
- capability to shut off circulation fans at central alarm and control facility
- residential buildings have:
  - lower than prescribed building height/occupancy
  - exterior balcony for each suite
  - prescribed areas of refuge

❑ emergency access to floor areas from exit stairs:
- no locking devices on doors giving access to prescribed floor areas except when other access provisions are available *as prescribed*
- at least one other exit must be accessible through unlocked doors within floor area

❑ means of venting each floor area by:
- openable windows/wall panels/smoke shafts *or*
- building exhaust system, if building sprinklered

Roof Plan *as required*

❑ fire fighting access:

❑ to roof with lower than prescribed slope on a building over 3 storeys in height:
- by stairway *or*
- by hatch of prescribed dimensions with fixed ladder
- with prescribed clearances around roof signs or other obstructions

❑ spatial separation/exposure protection of exterior walls in unsprinklered buildings:
- skylights in roof adjoining an exterior wall having unprotected openings closer than prescribed distances, horizontally and vertically
- combustible skylights permitted in non-combustible construction:
  - extent contingent on flame-spread ratings *as prescribed*

Reflected Ceiling Plans

❑ fire separations:
- fire stop flaps in rated membrane ceiling assemblies
- delineate % of total ceiling areas for finishes which may exceed flame-spread rating/smoke developed classification *as prescribed*

- ❑ fire detection systems:
  - fire detectors/smoke and heat detectors installed in all prescribed rooms
  - fire and heat detectors not required in sprinklered floor areas

Building Sections

- ❑ Indicate locations and fire-resistance ratings of all:
  - required fire separations/firewalls
  - floor/roof assemblies *as prescribed*
    - over basements (fire separation not required over crawl spaces *as prescribed*)
    - mezzanines considered as a storey
    - portion of roof supporting an occupancy
    - rated membrane ceiling assemblies
  - loadbearing walls/columns
- ❑ permitted combustible components in non-combustible construction:
  - combustible roofing materials *as prescribed*
  - combustible flooring/interior finish: maximum thickness *as prescribed*
  - combustible elements in partitions
  - protection required of foamed plastic in walls/ceilings/vertical service spaces *even in permitted combustible construction*
- ❑ vertical fire separations continuous elements:
  - from wall to wall
  - from floor up through ceiling space to underside of structure above (when separation falls under steel joists/beams, continuity maintained by rated enclosure of joists/sprayed fireproofing on beams *or other means*)
  - smoke-tight joints around entire perimeter
  - service penetrations fire stopped *except as noted below for horizontal service spaces*
  - openings protected with closures having prescribed fire-protection ratings:
    - fire dampers
  - combustible components abutting/supported by non-combustible fire separation designed so that their collapse under fire conditions will not cause collapse of fire separation
- ❑ horizontal service spaces:
  includes ceiling/duct/crawl/attic or roof spaces
  - no closure required at vertical fire separation, provided construction enclosing ceiling/plenum space has equivalent fire-resistance rating to that of vertical separation *as prescribed except*
  - not permitted when vertical fire separation encloses a vertical shaft
  - materials within horizontal service spaces:
    - conform to flame spread ratings/smoke developed classification *as prescribed*
    - supports for ceiling membrane non- combustible with melting point *as prescribed*
    - access panels required *as prescribed*
- ❑ firewalls continuous from ground to/through roof:
  - may terminate at underside of reinforced concrete roof slab *under certain provisions*
  - parapet height contingent on required fire-resistance rating of firewall *as prescribed*
  - not required in basement storage garage below firewall
  - connected/supported members/pipes/ducts designed so that their collapse will not cause collapse of firewall
  - no combustible projections on exterior of building permitted within prescribed distance either side of end of firewall
- ❑ spatial separation/exposure protection of exterior walls:
  - additional protection required for:
    - foamed plastic insulation in walls over three storeys high *as prescribed*
    - structural members outside exterior face of building closer than prescribed distance from property line
    - soffits of common attic/roof spaces spanning more than two residential occupancy suites or two sleeping rooms, *except when:*
      - spaces separated into compartments by fire stopping
      - eave overhangs separated from remainder of attic/roof space by fire stopping
      - suites/rooms are sprinklered
    - vertically separated openings in prescribed mercantile/industrial occupancies
- ❑ fire stops in concealed spaces:
  - in ceiling/flooring systems:
    - to separate spaces into prescribed maximum areas
  - in roofs/balconies/canopies:
    - to compartmentalize unsprinklered spaces at prescribed maximum areas/dimensions
    - contingent on flame-spread rating of construction materials

Elevations

- ❑ fire fighting access:
  - to every unsprinklered above grade storey within prescribed distance above grade by at least one unobstructed window or access panel of prescribed dimensions:
    - for each section of prescribed wall length
    - on each wall required to face a street
    - window glazed with plain glass *or*
    - access panel readily openable from both inside and outside
  - to unsprinklered basements having greater than prescribed horizontal dimension:
    - *refer to Floor Plans - basements*
- ❑ spatial separation/exposure protection of exterior walls
  - determine permitted maximum area of unprotected openings in an exterior wall for applicable limiting distance:
    - for unsprinklered/sprinklered buildings *as prescribed*
    - *convert area of unprotected openings to % of wall area for inclusion in building code data summary*
  - maximum area of unprotected openings doubled if openings glazed with:
    - fixed wired glass assemblies
    - glass block reinforced in each horizontal joint
  - exceptions for walls of open-air storage garage having greater than prescribed minimum limiting distance

high buildings:

- ❑ means of venting each floor area by openable windows/wall panels

Wall Sections

- ❑ permitted combustible components in non-combustible construction:
  - minor combustible components *as prescribed*
  - combustible material in metal roof deck assembly protected by:
    - gypsum board
    - thermal barrier
    - no protection required if building sprinklered
  - combustible vertical glazing/sash/frames:
    - *usually limited to first/first & second storeys*
    - extent contingent on flame-spread ratings
    - exceptions if sprinklers installed *as prescribed*
  - combustible components in exterior walls *as prescribed*
  - combustible insulation protection:
    - locations/protection contingent on flame- spread ratings
  - combustible elements in canopies/mezzanines:
    - protection of wall openings above marquees for unsprinklered buildings *as prescribed*
- ❑ fire stops in concealed spaces:
  - between concealed spaces in interior wall/ceiling/crawl spaces and concealed spaces in exterior walls and attic/roof spaces
  - in wall assemblies:
    - at every floor/ceiling level
    - at prescribed maximum horizontal/ vertical dimensions
    - exceptions as permitted

Details

interior elevations:

- ❑ delineate % of total wall areas for finishes which may exceed flame-spread rating/smoke developed classification *as prescribed*
  - flame-spread ratings modified in corridors *as prescribed*
- ❑ modifications/exceptions for sprinklered buildings *as prescribed*

fire stops in concealed spaces

- ❑ between concealed vertical and horizontal spaces in ceiling coves/dropped ceilings/ soffits or between stair stringers:
  - where flame-spread rating of exposed construction materials greater than permitted

stairs/ramps

- ❑ widths determined by occupant load *as prescribed*
- ❑ slip-resistant surfaces
- ❑ demarcation by colour/pattern *when publicly accessible:*
  - leading edge of treads/landings
  - beginning and end of ramps
- ❑ warning signs marking:
  - part of exit stair/ramp continuing past exterior exit door to basement
  - that exit stair in high building does not lead to exit at roof
- ❑ floor numbering on each side of doors to exit shafts
- ❑ stairs:
  - leading edge of treads:
    - radiused/beveled
    - at right angles to direction of exit travel *when publicly accessible*
  - tread/riser dimensions *as prescribed*

- run/rise in any one flight uniform
- no significant alteration in run/rise in successive flights in any stair system
- curved stairs permitted *as prescribed*
- maximum vertical rise of flights between floors/landings *as prescribed*
- minimum three risers except *as prescribed*
- minimum headroom clearance measured vertically from landing/stair nosing *as prescribed*
- landing dimensions/clearances *as prescribed*
- clearances between doors/risers *as prescribed*
- *exterior fire escape stairs permitted only for existing buildings as prescribed*

❑ ramps:
- slopes *as prescribed*
- landings/level areas adjacent to doors *as prescribed*

❑ handrails:
- number required determined by width of stairway/ramp
- height *as prescribed*
- continuously graspable *as prescribed*
- minimum clearance between handrail/wall *as prescribed*
- continuous on both sides of stairway, including landings *as prescribed for certain occupancy classifications*
- termination:
  - not to obstruct pedestrian travel/create a hazard
  - at least one handrail extended horizontally beyond top and bottom of stairway/ramp

❑ guards:
- height *as prescribed*
- openings through guard limited to sizes which would prevent/permit passage of spheres of prescribed diameters based *on occupancy classification*
- designed to prevent climbing
- exceptions *as prescribed*

elevators: fire alarm requirements *based on occupancy classification/occupant load of building:*

❑ elevators equipped with automatic emergency recall:
- manual in sprinklered high buildings:
  - key box/key switches in recall level lobby/central alarm and control facility
- identify recall level lobby to which elevator(s) return automatically upon fire alarm actuation in unsprinklered buildings

high buildings:

❑ at least one elevator equipped for emergency operation/use by fire fighters:
- with prescribed minimum size/load capacity
- protected by vestibule

Schedules

❑ doors & frames:
- minimum headroom clearance *as prescribed*
- maximum reduction of headroom by door closer/other device *as prescribed*
- doors in fire separations labeled:
  - fire protection ratings *as prescribed*
    - 20 minute closure ratings permitted *as prescribed*

❑ door hardware:
- latches *as prescribed*:
  - roller catches permitted in care facilities *as prescribed*
- self-closing devices
  - door stops *as prescribed*

❑ weatherstripping to retard passage of smoke *as prescribed*

❑ exit doors:
- readily operable without keys/special devices:
  - except in secure areas *as prescribed*
- no automatic locking except for doors into hotel rooms
- hardware mounted not higher than prescribed distance above floor
- closers/electromagnetic hold-open devices *as prescribed*
- electromagnetic locking devices permitted *except for certain prescribed occupancies*

❑ wall/partition/roof types:
- note fire-resistance ratings when applicable:
  - ULC references *or equivalents*

Structural

❑ heavy timber in combustible construction having prescribed maximum fire-resistance rating:
- minimum dimensions *as prescribed*
- avoid thin sections/sharp projections
- self-releasing hangers where supported by masonry walls

❑ fire-retardant treated wood:
- schedule/indicate locations
- roof system supported by:
  - fire-retardant treated wood
  - heavy timber
  - non-combustible
  - combination of the above

❑ stair/ramp handrails:

- designed to withstand nonconcurrent loading values *as prescribed*

❑ anchor systems on building exterior:
- for maintenance/window washing

Mechanical

❑ permitted combustible components in non-combustible construction:
- extent contingent on flame-spread rating/smoke developed classification
- exceptions if building sprinklered
- ducts/piping/plumbing fixtures

❑ fire separations/firewalls:
- fire dampers having prescribed fire protection rating in ducts penetrating fire separations
- fire stop flaps in rated membrane ceiling assemblies
- no ducts connecting storage garage/dwelling units permitted
- no penetrations through electrical vault fire separations except:
  - essential pipes/ducts *as prescribed*
  - ventilation duct/opening to outdoors

❑ means of egress:
- no penetrations through exit stairway/ramp walls except:
  - standpipe/sprinkler piping
  - noncombustible piping serving exit only
  - venting near bottom of stair shafts in sprinklered high buildings *as prescribed*
- use as a plenum not permitted
- fuel-fired appliances not permitted:
  - in corridors serving as an access to exit
  - under any exits

❑ carbon monoxide detectors:
- required *as prescribed*

❑ interconnected spaces:
- smoke control following activation of sprinkler system/smoke detectors:
  - automatic activation of air handling equipment
  - other measures *as prescribed*

❑ fire control systems:
- *requirement based on occupancy classification/occupant load of building*
- smoke control:
  - air handling system designed to limit circulation of smoke between:
    - storeys
    - suites within a storey
    - fire compartments
- automatic sprinkler system:
  - required for certain occupancy classifications *as prescribed*
  - designed to required NFPA standard
  - protected from freezing if located in unheated area
  - fire department connection located within prescribed unobstructed distance from hydrant
  - sprinklers required in:
    - rooms/closets immediately below roof assembly for which fire resistance rating waived
    - service spaces *as prescribed*
  - for buildings having fewer than prescribed number of sprinklers, water supply for sprinklers may be connected to domestic water system *as prescribed*
  - combustible sprinkler piping may be permitted in residential/light hazard occupancies, provided piping separated from areas served by ceiling/walls/soffits of prescribed construction
- standpipes/fire hose cabinets required for buildings:
  - over prescribed heights
  - unsprinklered buildings of any height having:
    - prescribed occupancies
    - larger than prescribed areas
  - fire department connection
  - hose connections:
    - on each storey of building
    - size *as prescribed* for building height/area
  - hose cabinets:
    - size to accommodate fire extinguisher in addition to prescribed hose/all accessories
    - locate cabinets where:
      - prescribed
      - fully opened door will not obstruct required exit width
    - cabinets not required in industrial buildings
- portable fire extinguishers:
  - required in all buildings:
  - exceptions within dwelling units *may be granted by Authorities Having Jurisdiction*

❑ buildings where impurities/contaminates have potential to create fire/explosion hazard:

- appropriate exhaust ventilation system
- explosion relief devices/vents/other protective measures

high buildings:

❑ means of venting each floor area by building exhaust system, if building sprinklered

Electrical

❑ combustible construction:
- protection of wires/cables/raceways *as prescribed*

❑ permitted combustible components in non-combustible construction:
- extent contingent on vertical char/flame-spread ratings *as prescribed*
- wires/cables/raceways

❑ means of egress:
- no penetrations through exit stairway/ramp walls except:
  - totally enclosed wires/cables, noncombustible raceways serving exit only

❑ interconnected spaces:
- smoke control following activation of sprinkler system/smoke detectors:
  - emergency power available, supplied by emergency generator/separate power supply

❑ fire alarm and detection systems:
- *requirement based on occupancy classification/occupant load of building*
- central alarm and control facility installed close to building entrance facing street or fire department access route
- fire detectors/smoke and heat detectors installed in all prescribed rooms:
  - fire and heat detectors not required in sprinklered floor areas
  - in unsprinklered buildings, provide smoke detectors designed as part of the building fire alarm system:
    - in each elevator lobby on each storey
    - in recall level lobby to divert elevator on automatic emergency recall to an identified alternate floor level
- manual pull stations at prescribed locations
- alarm signals:
  - audible signal devices:
    - located to be clearly audible throughout floor area served
- visual signal devices:
  - provided in areas:
    - occupied by persons with hearing impairment
    - having high ambient noise levels
    - used for special care/treatment
  - located to be visible throughout floor area served
- smoke alarms installed in:
  - each storey/mezzanine of a dwelling unit
  - each sleeping room not within a dwelling unit

❑ emergency lighting/power:
- exit signs:
  - visible from exit approach
  - over exit doors *as prescribed*
  - additional signs as required to indicate direction of egress
- minimum prescribed illumination level in:
  - exits/corridors
  - various occupancies *as prescribed*
- emergency power for:
  - emergency lighting
  - fire alarm system
  - building services, including:
    - elevators/smoke control/venting in high buildings
    - water supply for fire fighting where supply is dependent on electrical power supplied to building
  - not required for water supply to standpipe system

high buildings:

❑ central alarm/control facility:
- readily accessible to fire fighters at entrance level
- voice communication system

❑ electrical conductors supplying emergency equipment:
- protected by rated separations
- meeting fire endurance tests

Checklist: Information to Include on Drawings for Small Part 9 Buildings

Notes
If an architect is engaged for a project which falls within the definitions for Part 9, the services provided by the architect should uphold the professional standards outlined in these Checklists, whether or not the Building Code requires the building to be designed by an architect.

The Checklist is divided into two levels of detail, either of which may be used as appropriate. The first level covers the minimum documentation necessary to obtain a Building Permit.

The second level of detail, which is underlined, expands the scope to a full set of documents appropriate for a custom design.

Comments, clarifications or recommendations are in *italics*.
Use of a forward slash (/) signifies *and* or *or*

Title Block

refer also to Chapter 2.3.7, page 6

- ❑ *use same drawing (sheet) size and title block layout for **all** drawings in the project set, including drawings prepared by landscape architect, engineers or other consultants: (if some consultants prefer to use their own title block layout, they may do so, provided all the following information is included in their title block and their drawing size is the same as the architectural drawings)*
- ❑ project name/address *same on all drawings, including drawings prepared by consultants*
- ❑ project number
- ❑ date *same date on all drawings, including drawings prepared by consultants*
- ❑ *three columns:*
  - *the first headed* ISSUED FOR *stating reason for issuing drawings, for example:permit application/client approval/bidding/ addenda/contract/construction/change order/etc.*
  - *the second column headed* DATE,
  - *the third for the* INITIALS *of the person responsible for the issuance*
- ❑ drawing (sheet) title
- ❑ drawing (sheet) number + revision suffix *as required*
- ❑ scale of plot or paper copy *use additional graphic scale on any drawings which may be reduced*
- ❑ revision details:
  - revision number
  - date
  - general description
  - initials of originator
- ❑ name/address/e-mail address/telephone & fax numbers of architect's office *[in Ontario, name of the holder of the Certificate of Practice must appear]*
- ❑ architect's logo *optional*
- ❑ names or initials of CAD technician or draftsperson and person checking drawing
- ❑ space for north point *on relevant drawings only (Site Plan, Key Plan, Floor Plans, etc)*
  - *if the angle of the building on the site is such that the orientation of a side is not readily apparent, **add** an arbitrary* 'project north' *point, aligned parallel to the building, beside the correct* 'true north' *point*
- ❑ location diagram with portion of building plan cross-hatched showing which part of floor is on sheet *required only if entire building plan, when drawn at recommended scale, will not fit on one sheet*
- ❑ space for applying architect's professional seal and signature

(NOTE: on small projects, it may be convenient to include components designed by an engineer (e.g. structural elements; heating system; electrical circuitry) on an architectural drawing which is sealed and signed by the architect; in this event, the engineer's professional seal must also be applied to each relevant drawing (preferably placed adjacent to the components designed by the engineer), with a notation identifying which items the engineer is responsible for)

- ❑ title block on separate drawings for engineering disciplines should be similar in content and format except that architect's logo, professional seal, name and other information are omitted and replaced by corresponding logo, professional seal, name and other information for engineer(s) subject to:
  - *contractual arrangement with consultants*
  - *requirements of provincial association*
  - *professional liability insurer*
- ❑ notice of copyright (refer to chapter 2.3.7 Supplement No. 1, September 1999)
- ❑ electronic file name and number/date of plot *placed consistently at very bottom or top of title block*

Cover Sheet *(optional)*

- ❑ project name
- ❑ project location *small-scale partial map of community with location of project marked/ placed on Site Plan sheet if cover sheet not used*
- ❑ architect's name, logo
- ❑ list of drawings *in specifications or first sheet if cover sheet not used*

Site Plan

scale: as large as feasible within selected sheet size

- ❑ *note stating data taken from survey plan/other information provided by client (refer to Chapter 2.3.4, Checklist CH-42):*
  - *give surveyor's name and drawing title/number/date*
  - *note stating source(s) of other information*
  - *same building orientation as floor plans*
- ❑ project location *small-scale partial map of community with location of project marked*
- ❑ site boundaries:
  - dimensions/orientation of property lines
  - angles at intersections
- ❑ rights-of-way/easements
- ❑ zoning setback lines *if required by Authorities Having Jurisdiction*
- ❑ benchmark, noting its:
  - actual (geodetic) elevation
  - assumed (convenience) elevation *used for specific project/usually designated 100m*
- ❑ existing conditions:
  - levels/elevations:
    - contour lines/spot elevations
    - indicate top/bottom at abrupt changes in level
    - crown of street(s)/top & bottom of curbs
  - ditches/swales/water courses/ponds
  - catch basins/fire hydrants/maintenance access covers
  - existing buildings/fences/poles/ buried services:
    - on site
    - adjacent to site
    - differentiation between existing/new for addition/renovation projects
  - paving:
    - sidewalks/paved areas/ driveways/curbs/curb cutouts
  - vegetation:
    - species/caliper of trees greater than 100mm
    - shrubbery
- ❑ borehole locations *as required; borehole logs* ***not*** *shown on drawings, but available in geotechnical report referenced in specifications*
- ❑ outline of building on site:
  - located horizontally from property lines
  - main floor level:
    - geodetic elevation or
    - relative to bench mark
- ❑ grading/earthwork:
  - proposed levels/elevations *some of this information may appear on landscape architectural drawings or civil engineering drawings*
- ❑ landscaping:
  - existing planting/trees to be removed/retained/protected
  - proposed *new landscaping may be developed later by landscape architect*
- ❑ site works:
  - paving:
    - light/medium/heavy duty asphalt *indicate extent of each*
    - parking areas/roads

  - parking lot layout/painted lines
  - fire access route(s)
  - interlocking
  - other
- sidewalks/curbs/ramps
- concrete pads for transformers/air conditioning condenser *as required*
- oil tank *as required*
- surface water drainage:
  - ditches/swales/catch basins
  - flood control/containment/confined areas/other environmental protection *as required*
  - siltation control devices *as required by Authorities Having Jurisdiction*
- septic tank/disposal bed *as required*
- well *as required*
- proposed levels/elevations
- fencing/walls/garbage enclosure/hoarding

❑ site servicing information:
- *some or all of this may be shown on engineering drawings*
- system of foundation drainage
- catch basins/fire hydrants/maintenance access covers
- utilities and other service connections

❑ zoning and building code data *(refer to OAA Practice Bulletin A.9, April 2002)*

❑ site details *as required*

Key Plan *recommended*

recommended scale: 1:200

❑ outline plan of each floor level *to show entire building layout on one drawing sheet:*
- differentiation between existing/new for addition/renovation projects *by cross-hatching/shading*
- no hatching or detail
- all doors with swings *not necessary to show windows*
- ramps/stairs, with up/down arrows
- toilet partitions/plumbing fixtures
- names/numbers of all interior spaces
- finish floor level/elevation *for each floor level*

❑ structural grid lines *as required*

❑ primary dimensions:
- overall
- column centres *as required*

❑ fire separations and ratings *as required*

❑ exits *as required*

❑ exit calculations *as required*

❑ location of building sections, cross referenced to other drawings

❑ zoning and building code data *if not on Site Plan sheet*

❑ any other general information

Floor Plans

recommended scales: 1:100, 1:50

decision on appropriate scale depends on complexity of plan information to be provided. If larger scale is selected, plan blow-ups of complex areas may not be required. Incorporate ***all*** *items noted under Key Plans if Key Plans not used. Ensure same orientation for all floor plans.*

❑ differentiation between existing/new for addition/renovation projects *by cross-hatching/shading*

❑ outline plan of each floor of entire building, including basement *or foundation plan if building has no basement* showing:
- scope of demolition work *as required*
- all exterior walls/interior partitions
- doors with swings/windows/other openings -door sizes/types *or provide door schedule*
- basement walls/piers/columns
- outline of wall/pier/column *footings dotted on basement or foundation plan*
- names of all interior spaces *if Key Plan not used*
- identifying number of each space *as required*

❑ finish floor level/elevation *for each floor level*

❑ ramps/stairs, with up/down arrows

❑ plumbing fixtures/toilet partitions *as required*

❑ detailed plan of each floor level:
depending on scale selected, it may be necessary to divide each floor into segments shown on separate drawing sheets; (in this case, indicate match line between segments of plan on each sheet)

❑ delineate wall components:
- masonry wythes/cavity
- insulated metal wall systems
- EIFS/drywall/cladding to stud walls
- *(not necessary to cross-hatch each element if wall types identified by reference numbers as below)*

❑ identify wall assembly types by reference numbers:
- *W1, W2, etc. for exterior walls; P1, P2, etc. for interior partitions*

- schedule giving thickness/name of each component of each wall assembly type, *including cavities, if any,* and locations of air & vapour barriers:
  e.g. W1
  90mm masonry veneer
  50mm air space
  60mm semi-rigid insulation
  air/vapour barrier
  190mm concrete block

(Note: *do not give specifications for components, unless no separate specification document is provided*)

- ❑ structural grid *as required*
- ❑ dimensions:
  - overall wall thickness *(not necessary to dimension each element if wall types identified by reference numbers as above)*
  - partitions
  - locations of windows/doors/other openings

  showing overall dimensions as required
  - column centres *as required if Key Plan not used*
  - cabinetwork *only if interior elevations not used*
- ❑ fire separations and ratings *as required if Key Plan not used*
  - minimum clearances to combustible framing
- ❑ exits *as required if Key Plan not used*
- ❑ exit calculations *as required if Key Plan not used*
- ❑ location of building cross-sections/details *if Key Plan not used:*
  - cross-references to building section/ detail drawings

(Note: use same symbol/geometrical shape consistently for each type of reference throughout set of drawings)

- ❑ outlines of cabinetwork:
  - kitchen/bathroom
  - closets, including rod & shelf/shelves
- ❑ cross-references to interior wall elevations *as required*
- ❑ other work not indicated elsewhere:
  - concrete bases for mechanical/ electrical equipment
  - manufactured items:
    - panel folding doors
    - washroom accessories
    - prefabricated shelving
- ❑ structural:
  - joists/beams/lintels/rafters/roof trusses *show span directions*
  - cross bracing *as required*
  - columns
  - *may be on separate drawing(s) prepared by structural engineer*
- ❑ heating/ventilating/air conditioning:
  - locations of supply and return air grilles *when critical for furniture layouts*
  - main duct risers
  - exhaust fans
  - heat recovery ventilator *as required*
  - furnace/boiler/package HVAC unit(s)
  - hot water heater
  - A/C condenser
  - meters:
    - gas/water
    - location of remote readers *as required*
- ❑ electrical:
  - receptacles/switches/fixtures
  - smoke/CO detectors
  - main panel/service location
  - electricity meter
- ❑ heating/ventilating/air conditioning/electrical:
  - *usually on separate drawing(s) prepared by mechanical/electrical engineer(s)*

Roof Plan *as required*

recommended scales: 1:200, 1:100, 1:50 *not necessarily at same scale as Floor Plans*

- ❑ *same orientation as floor plans*
- ❑ differentiation between existing/new for addition/renovation projects *by cross-hatching/shading*
- ❑ type of roofing (identify roof assembly types by reference numbers *as appropriate*)
- ❑ slope directions
- ❑ location of building cross-sections/details and cross-references to building section/ detail drawings
- ❑ drains/sumps/scuppers/gutters
- ❑ roof pads/curbs/anchors/ladders/guard rails *as required*
- ❑ parapets/low rise walls/screens
- ❑ access hatches/skylights
- ❑ vents/chimneys
- ❑ roof walkways
- ❑ roof-mounted mechanical equipment

Reflected Ceiling Plans *as required*

recommended scales: 1:200, 1:100 (*not necessarily at same scale as Floor Plans)*

- ❑ *same orientation as floor plans*
- ❑ ceiling types - refer to type designations used in finish schedule
- ❑ layout of ceiling suspension grid(s)
- ❑ bulkheads - details *preferably located on*

same sheet
- ❑ cross-references to detail drawings *as required*
- ❑ light fixtures
- ❑ supply diffusers
- ❑ return air grilles
- ❑ heat/smoke detectors *as required*
- ❑ carbon monoxide detectors *as required*
- ❑ legend *showing symbols used*

Building Sections

recommended scales: 1:100, 1:50

- ❑ show all building components that intersect with section - *may include interior elevations showing cabinetwork (kitchen/bathroom/etc.)*
- ❑ differentiation between existing/new for addition/renovation projects *by cross-hatching/ shading*
- ❑ wall assembly types *only if required to augment/clarify notations on floor plans; refer to Floor Plans*
- ❑ levels/elevations:
  - finish floor *for each floor level*
  - roof bearing at walls *as required*
  - grade at building
  - bottom of footings
- ❑ structural grid lines *as required*
- ❑ vertical dimensions:
  - floor to floor
  - floor to roof *as required*
  - window openings
- ❑ fire separations and ratings *as required*
- ❑ cross-references to detail drawings - *use same symbol/geometrical shape consistently for each type of reference throughout set of drawings*
- ❑ structural:
  - footings
  - joists/beams/lintels/rafters/roof trusses *only if required to augment/clarify notations on Floor Plans*
  - in section
  - in elevation *if beyond*
- ❑ heating/ventilating/air conditioning:
  - main horizontal ducts
  - major equipment

Elevations

recommended scales: 1:100, 1:50

- ❑ all building faces:
  - include below-grade foundation walls/footings *dotted*
  - line of grade at building face *(if building form is complex, identify parts of elevation by letter or number on location diagram in title block)*
- ❑ differentiation between existing/new for addition/renovation projects
- ❑ openings - doors/windows/grilles/vents
- ❑ attachments - light fixtures /receptacles/signage/downspouts/flagpoles/ etc. *as required*
- ❑ structural grid lines *as required*
- ❑ exterior construction materials:
  - graphically/notations
  - masonry control joints
- ❑ locations of interior/hidden levels:
  - floors
  - finish floor level/elevation *for each floor level*
  - flat roofs behind parapets
- ❑ vertical dimensions:
  - to doors/windows/other important items requiring location
  - floor to floor or floor to roof *only if not shown on Building Sections*
- ❑ location of building cross-sections/details *only if required to augment/clarify notations on Floor Plans*
- ❑ cross-references to building section/detail drawings *as required*

Wall Sections

recommended scale: 1:20

One or more vertical wall sections may be sufficient to describe/locate all components of typical wall construction; if basic information required for Building Permit cannot be shown adequately by building and wall sections, use large-scale details to show assemblies
(refer to Details)

- ❑ Show all building components that intersect with section:
  - section continuous from footing to roof
  - incorporate typical window or door condition
  - indicate location/material of air/ vapour barriers
  - backfill line *showing foundation drainage/backfill layers*
  - special drainage *as required*
- ❑ column line *as required* - dimensioned to wall face(s)
- ❑ vertical dimensions

- ❑ cross-hatching/symbols to indicate materials, plus notations *alternative: identify wall assembly types by reference numbers (refer to Floor Plans)*
- ❑ structural:
  - footings/reinforcing
  - anchor bolts
  - joists/beams/lintels/rafters/roof trusses

Detailed Floor Plans

recommended scales: 1:50, 1:20
plan blow-ups of complex areas, as required

- ❑ bathrooms/washrooms
- ❑ kitchens
- ❑ special floor finish layouts/patterns/details
- ❑ cross-references to detail drawings *as required*

Details

large-scale details of all building envelope/ assembly conditions:
recommended scales: 1:10, 1:5

- ❑ vertical section details, arranged according to relative positions in wall *typically*:
  - wall/floor intersections
  - window sills
  - window/door heads
  - wall/roof intersections
  - wall assembly type reference numbers
- ❑ horizontal section details *typically*:
  - corners
  - intersections with columns/partitions
  - window/door jambs
- ❑ notations:
  - floor/roof levels/elevations *on vertical section details*
  - typical assemblies not covered by reference numbers
  - through-wall flashings
  - air/vapour barriers
  - dimensions not already shown on plans/elevations/building sections

other details:

small-scale key drawings of assemblies (stairs/ cabinets/etc.) cross-referenced to large-scale details on same or adjacent sheets
recommended scales: 1:50, 1:20, 1:10, 1:5, 1:1
as required

- ❑ door/window elevations:
  - hollow metal door/sidelight/window frames
  - aluminum entrance/sidelight/store front frames
  - window types
  - door types
- ❑ interior wall elevations:
  - elevations of cabinetwork *typically showing horizontal dimensions*
  - other wall-mounted items
- ❑ stairs/handrails/guards
- ❑ fireplace(s)
- ❑ outdoor decks/stairs/rails/trellises
- ❑ cabinetwork/millwork - fully dimensioned, large-scale sectional details
- ❑ large scale sectional details *as required:*
  - wood/aluminum window frame components
  - hollow metal frames

Schedules *as required*

- ❑ wall types *refer to Floor Plans*
  - exterior walls
  - interior partitions
- ❑ roof types *refer to Roof Plan*
- ❑ doors and door frames
- ❑ windows
- ❑ lintels
- ❑ hardware
- ❑ room finishes
- ❑ colour
- ❑ planting

Chart: National Building Code Data Matrix

Introduction

The purpose of the matrix is to provide a standardized system for including building code - related data on a set of drawings that are submitted for building permit application. Numbers in the matrix are the relevant National Building Code (NBC) references. The matrix may be modified to suit the references in various provincial building codes. The Ontario Association of Architects (OAA) has a similar matrix available to be used with the Ontario Building Code.

It is important to put this matrix in a prominent location on the drawings which will:

- expedite the building official's review of the application;
- inform others (contractors, trades, consultants, etc.) about applicable NBC related issues.

Additional information such as exiting widths and routes, fire separations and other data is generally shown on separate drawings, as necessary.

Procedure

1. Establish a system in your practice that facilitates retrieval of the information to be shown on the application for building permit;
2. Ascertain this information through a code analysis in the early design stages of a project and reconfirm it throughout the design development and construction documents (drawing) stages;
3. Consider using the NBC Data Matrix as a standard format which can be adapted as required to meet the specific requirements of each project. It may be preferable to provide more than one matrix for complex projects (for example: underground parking garage - Part 3, townhouses - Part 9, on same site);
4. Assign a location for NBC Data Matrix on the drawings as an office standard (one of the first or top drawing sheets is best);
5. Add exit capacity calculations confirming that exit capacity exceeds occupant load on the same drawing sheet as the NBC Data Matrix, or separately, as appropriate. Always verify reference numbers against the latest NBC revisions;
6. Coordinate with structural, mechanical and electrical engineering consultants and share data with them based on your code analysis;
7. Instruct them to include NBC related data pertinent to their disciplines on their drawings. The building code data should be:
   - prepared specifically for the project;
   - in a similar format;
   - in accordance with the standards of their profession.

If the NBC Data Matrix is included in a project manual (rather than on the drawings), ensure that building name and address, project number and date of issuance are inserted at the top of the matrix.

Completing the Matrix

Matrix presents elements selected from the detailed code analysis and provides a quick overview to the municipal building officials of the key NBC factors governing the design of the project.

Item No.	
1	Check whether the work is regulated by Part 3 or Part 9; identify project; check whether project is new, an alteration and/or addition, or if there is a change of use.
2	Identify major occupancy(s).
3	Enter building area and extent of new and existing; if a portion of the building is to be demolished, enter in the "existing" space only that portion which is to remain, such that the total of new and existing is the area of the final product.
4	NBC does not refer to "gross building area", however, this concept and terminology may be relevant in some jurisdictions.
5,6	Enter number of storeys above and below grade, and height of building.
7	Enter number of streets and access routes.
8	Enter NBC building classification.
9	Obtain information on proposed sprinkler system from engineer; check appropriate box.
10, 11	Obtain information from engineer; check appropriate "yes" or "no" box for requirement for standpipe and fire alarm.
12	Obtain information from engineer responsible; check appropriate box relative to adequacy of water supply for fire protection.
13	Check appropriate box.
14	Enter permitted and actual combustible/non-combustible construction information.
15	Note whether there are mezzanines: how many, where, the area of each or, if none, enter N/A.
16	Provide design information as to occupancy and occupant load per floor, and whether this is derived on the basis of building design, or on the Code requirement for floor area per person.
17	Check appropriate box; if "no" is checked, provide explanation why.
18	Check appropriate box.
19	Enter in spaces provided, required fire resistance rating for floors, roofs and mezzanines, and for supporting members for these; also enter listed design numbers (e.g. ULC) or description for horizontal assemblies and their supporting members. If space in the matrix is inadequate, prepare a separate table, cross referenced for different major occupancies in building as appropriate.
20	Establish "Project North" orientation if different from "Compass North", and show both on Site Plan. Enter spatial separation information in appropriate columns for each elevation, where applicable, identifying Exposing Building Face (EBF), Limiting Distance (LD), Length (L), and Height (H) of building. Use a separate table for spatial calculations if project is more complex than can be accommodated in this table, cross referencing appropriately.
21	Enter any other information that will assist in expediting the issuance of building permit.

References

National Building Code of Canada 1995, revised up to April 2002
OAA Practice Bulletin A.9

Item	National Building Code Data Matrix Parts 3 & 9	NBC Reference	
1	Project Description: ❑ Change of Use ❑ New ❑ Addition ❑ Alteration	❑ Part 3	❑ Part 9 2.1.3.1 9.10.1.3
2	Major Occupancy(s)	3.1.2.1.(1)	9.10.2
3	Building Area (m^2) Existing _____ New _____ Total _____	1.1.3.2	1.1.3.2
4	Gross Area Existing _____ New _____ Total _____		
5	Number of Storeys Above grade _____ Below grade _____	3.2.1.1 & 1.1.3.2	2.1.3.1
6	Height of Building (m)		2.1.3.1
7	Number of Streets/Access Routes	3.2.2.10 & 3.2.5.5	
8	Building Classification	3.2.2.20-.83	9.10.4
9	Sprinkler System Proposed ❑ entire building ❑ basement only ❑ in lieu of roof rating ❑ not required	3.2.2.20-.83 3.2.1.5 3.2.2.17	9.10.8.2
10	Standpipe required ❑ Yes ❑ No	3.2.5.8	
11	Fire Alarm required ❑ Yes ❑ No	3.2.4	9.10.17.2
12	Water Service/Supply is Adequate ❑ Yes ❑ No	3.2.5.7	
13	High Building ❑ Yes ❑ No	3.2.6	
14	Permitted Construction ❑ Combustible ❑ Non-combustible ❑ Both Actual Construction ❑ Combustible ❑ Non-combustible ❑ Both	3.2.2.20-.83	9.10.6
15	Mezzanine(s) Area (m^2)	3.2.1.1.(3)-(8)	9.10.4.1
16	Occupant load based on ❑ m^2/person ❑ design of building Basement: Occupancy _____ Load ____ persons 1st Floor Occupancy _____ Load ____ persons 2nd Floor Occupancy _____ Load ____ persons 3rd Floor Occupancy _____ Load ____ persons	3.1.1.6	9.9.1.3
17	Barrier-free Design ❑ Yes ❑ No(Explain)	3.8	9.5.2
18	Hazardous Substances ❑ Yes ❑ No	3.3.1.2.(1) & 3.3.1.19(1)	9.10.1.3.(4)
19	Required Fire Resistance Rating (FRR) Horizontal Assemblies FRR (Hours) Floors _____ Hours Roof _____ Hours Mezzanine _____ Hours FRR of Supporting Members Floors _____ Hours Roof _____ Hours Mezzanine _____ Hours Listed Design No. or Description (SG-2) Listed Design No. Or Description (SG-2)	3.2.2.20-.83 & 3.2.1.4	9.10.8 9.10.9
20	Spatial Separation – Construction of Exterior Walls	3.2.3	9.10.14

Wall	Area of EBF (m^2)	L.D. (m)	L/H or H/L	Permitted Max. % of Openings	Proposed % of Openings	FRR (Hours)	Listed Design or Description	Comb. Const	Comb. Constr. Nonc. Cladding	Non-comb. Constr.
North South East West										
For Additional Walls, add additional rows										

21	Other



2.3.8 Construction Documents — Specifications

Canadian Handbook of Practice for Architects

2.3.8

Introduction

Specifications and Drawings

Types of Specifications
- Outline or Preliminary Specifications
- Master Specifications
- Model Specifications
- Project Specifications

Methods of Specifying
- Proprietary Method
- Prescriptive Method
- Performance Method

Reference Standards

MasterFormat™
- SectionFormat

Master Specification Systems
- Office Master Specification Systems
- National Master Specification (NMS)
- U.S. Master Specification Systems
- Proprietary Systems and Specification Writers

Preparing Specifications
- Resources
- Coordination
- Assembling Specifications Sections
- Revisions
- Office Procedures and Standards
- Specification Language

The Bid Package
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Construction Documents — Specifications

Introduction

In the construction industry, the term "specifications" means a clearly written description of the intended work of a project. Specifications are precise descriptions of products, materials, standards, equipment, services, construction systems, construction methods and processes, and workmanship.

The specifications also describe physical and environmental conditions to be created and maintained in the work area, on site, in adjacent areas, or off site. In addition, the document sets out procedures for contract administration required to control and monitor the quality of the work.

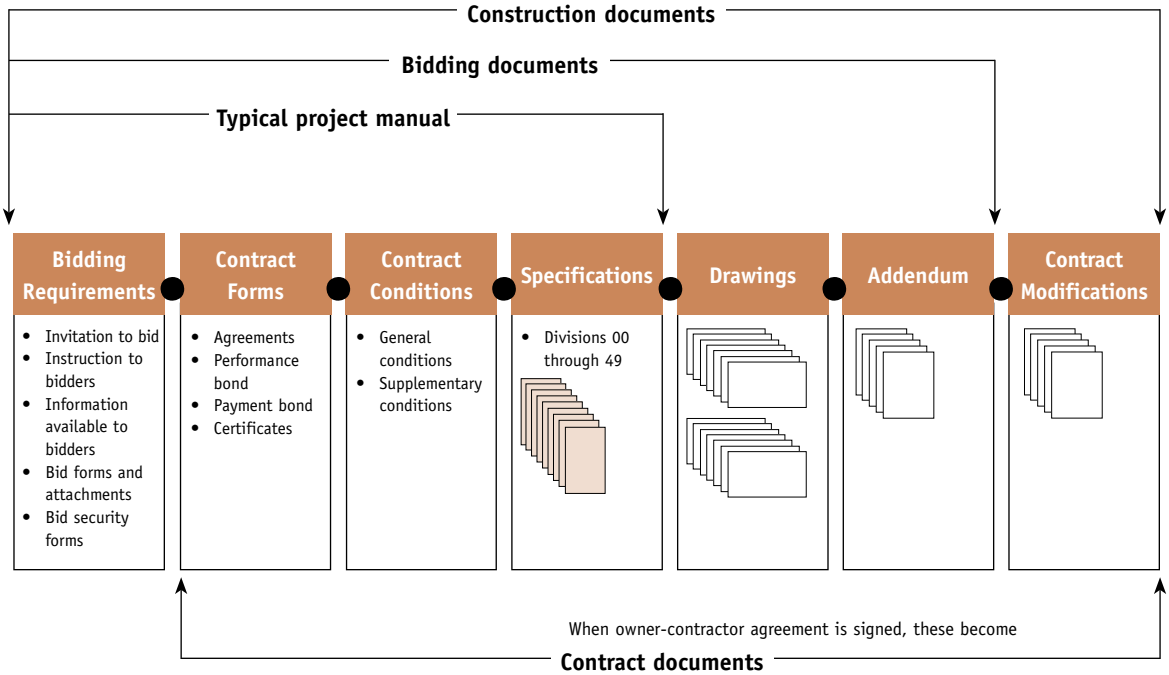
The term "**Project Manual**"— used by The Construction Specifications Institute and by Construction Specifications Canada — refers to the following items, which are bound in book format:

- bidding requirements;
- contract forms;
- contract conditions;
- specifications.

This chapter discusses specifications and — to a certain extent — their relationship to the drawings.

Refer to Chapter 2.3.9, *Construction Procurement*, for information on bidding requirements, contract forms, and contract conditions.

Illustration 1: Format for Construction Documents



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Specifications and Drawings

Specifications must be read and interpreted together with all of the construction documents in combination. The drawings, schedules (which are tables listing components and their locations and properties), and any other graphic representation, supplement the written word.

Refer to Chapter 2.3.7, *Construction Documents — Drawings*, for a description of the drawings.

Most construction contracts, including CCDC indicate that:

- specifications are part of the contract documents;
- the drawings, together with the specifications, translate the design concept into a detailed description of a building;
- in the event of conflict between the two, the specifications take precedence over the drawings.

The specifications become part of the contract documents and should convey information that is clear, concise, correct, comprehensive, and well-coordinated.

Drawings and specifications present different types of information and are complementary.

Drawings:

- illustrate extent, location, and quantity;
- are graphic or pictorial descriptions.

Drawings identify a material or product only by a generic name, and illustrate its approximate shape, dimensions, and location.

Drawings and schedules provide the specification writer with the following information:

- configuration, location, and dimension of each assembly, component or accessory;
- identification of pre-fabricated or pre-assembled components or equipment.

Specifications:

- reduce the need for notes on the drawings;
- are the only location where brand names of products should appear (generally, brand names should **not** be on the drawings);
- describe workmanship and installation.

The function of the specifications is to:

- complement and permit simplification of the drawings;
- limit the role of the drawings to address form, shape, dimension, and location;
- describe requirements for quality and workmanship which the drawings may not be able to address;
- address compatibility of materials.

Types of Specifications

There are a number of types of specifications, including:

- outline or preliminary specifications;
- master specifications;
- model specifications;
- project specifications.

Outline or Preliminary Specifications

This document is prepared during the design stage and describes the project components in general terms — appearance, texture, and other criteria — which affect the image and function of the project. Outline specifications are usually prepared at the design development stage to provide early coordination of terminology between drawings and specifications, and used together with design drawings in making presentations to the client.

Refer also to Chapter 2.3.6, *Design Development*.

Master Specifications

This is a comprehensive text base, containing descriptions of every procedure, product or method likely to be encountered. This collection of specifications can be used in developing a project specification by editing the contents to suit the requirements of the project. The editing is made easy because most of the required text is included in the master document and, to a large extent, one only has to *delete* the unwanted text.

In the case of the National Master Specification (NMS), the text contains and highlights the choices by presenting all of the commonly used alternatives, in square brackets. In other cases, blank spaces — in square brackets — indicate

when a decision must be made. The NMS also uses "Spec Notes" to offer guidance and direction.

It must be emphasized that any master specification must be used very carefully. Such a comprehensive document can be very useful as a checklist for making decisions when assembling a project. However, the process — no matter how easy or convenient — does not reduce the knowledge and experience required to produce an effective project specification.

Model Specifications

This is a specification assembled to suit specific and similar kinds of projects, such as certain buildings within "Part 9" of the building code and some repetitive kinds of projects. Because the technology used to build such projects is common to the building type, such model specifications usually require minimal editing, except for describing site work which is unique to the location.

Project Specifications

Project specifications are usually one-of-a-kind specifications developed for a specific project. Based on the form of construction project delivery, there are usually two different types:

- *Project Specifications for a Stipulated Sum Contract*
  This specification is compiled and written to describe an entire project and is addressed to one general or coordinating contractor.
- *Project Specifications for a Construction Management, Phased, or Design-Build Project*
  This specification is prepared as a number of related but stand-alone modules, each of which has its own "front end" and can form the basis of an individual bid call and contract. The work of each contract is then coordinated into a combined process by a construction manager or Design-Builder to deliver the overall project.

Depending on the form of project delivery, some small projects may include the specifications on the drawings; however, it is important that minimum standards of practice are maintained and all health and life safety requirements are included.

Methods of Specifying

Contemporary construction specifications can be prepared using the following descriptive methods:

- **proprietary** (describes specific products and systems by trade name);
- **prescriptive** (describes the exact means and methods for achieving the desired result);
- **performance** (outlines criteria of a desired result, giving the contractor freedom in choice of materials and method).

These may be used individually or in combination, in outline or in detailed format.

After evaluating the products, systems, and processes for each segment of construction, the architect must decide which specifications method to use. These decisions depend in part on the architect's ability to evaluate specifications, details, and data published or provided by product manufacturers.

Proprietary Method

Proprietary specifications identify products by their trade names and important characteristics, often using catalogue descriptors. Restricting specifications to a single trade name results in the exclusion of others. Naming several acceptable alternatives — such as three or four manufacturers' products — promotes competition, as long as all products or systems listed meet similar criteria.

Example: *Doors (type 5): Flush, Stainless Steel — LS-18 1 by Steelcraft, prepared for glazed opening and louvre as per Door Schedule.*

Note: three or four acceptable alternative products which meet minimum criteria should be listed.

Occasionally, the architect may determine that only one product is appropriate for the project and only that sole product is specified.

Example: *Ceramic Wall Tile (type 6) as scheduled:*
308 mm x 308 mm
beige-brown speckled 'Exemplary Harmony'
By Steenbok Capricorn
No substitutes considered.

The architect may decide to specify one particular product, assembly, equipment or system, as a basis of the specification and invites the contractor to propose an alternative product or system for review. This method may be used, for example, by an engineering consultant, for a complex mechanical or electrical system. This maintains the competitive approach to the bidding process.

Example: The design and specification of the mechanical piping system is based on the use of products by Victaulic. Other acceptable alternative systems will be considered in accordance with procedures established in the Instructions to Bidders.

Public sector clients will usually not permit the proprietary method of specification.

Prescriptive Method

A prescriptive specification is a detailed statement of products, materials or systems and their installation requirements. It is a generic description of what is required, using no product, trade or manufacturers' names, or any reference to manuals or standards. Products and materials are defined, together with a step-by-step list of operations to produce the desired result. Extensive knowledge and experience do not guarantee that the results of a given combination of materials and specific operations will be satisfactory.

The architect must obtain sufficient information and practical experience to describe all the materials and operations necessary for fully prescriptive specifications. The architect's potential liability may be increased because, it might be argued, the architect, rather than the contractor, assumes responsibility for performance, provided the contractor follows the specifications.

Prescriptive specifications do not recognize that there is often more than one way of carrying out a given operation to achieve the intended result. It may be useful to include the following when preparing prescriptive specifications: "complete all work in accordance with the manufacturer's written instructions and specifications."

The architect should separate those construction components which can be adequately and competently described by prescriptive specifications from those which are best described by performance specifications.

Example: a 26-gauge, pre-finished sheet metal flashing

Performance Method

Performance specifications describe the desired end result of how the materials and systems will perform in the completed building. Extensive reference to material standards establishes the project's performance criteria, such as appearance, strength, and durability. When a detailed description of the product is accompanied by a performance statement, then the contractor is clearly responsible for the end product. To achieve the best results, the architect should remember that performance is the prime factor. Full performance specifications require additional research by the architect.

Example: .1 Windows: to CAN/CSA - A440 [M90]
.1 Type: Projected: top projected with triple glazing
.2 Classification Rating
.1 Air Tightness: A3
.2 Water Tightness: B5
.3 Wind load resistance: C2
.4 Condensation Resistance: Temp Index [ ]

Here, the specifier chooses to describe what is needed to comply with the requirements of the project, rather than describing how it is to be built to ensure its required performance. When a component is required to comply with testing procedures that is, in effect, a performance specification.

Often, performance specifications are used to describe systems such as elevators and mechanical systems where performance and capacities must be determined and maintained.

Example: Electric Elevator:
1.3 Description of System:
Platform: 1500 mm x 2000 mm
Rated Load: 2000 kg
Rated Speed: 10 metres/sec
Travel: from basement to 5th floor — 20000 mm

Reference Standards

Specifications frequently incorporate references to standards published by standards organizations and trade associations. Well-written standards allow some latitude in the means of achieving the desired end result, while establishing industry-accepted standards of practice and performance. Provided they are fully familiar with the latest edition of the standards, architects may choose to incorporate some of them, by reference, into the specifications.

References include standards — such as CSA, CGSB, and ASTM, or appropriate trade manuals — to define common criteria. Such trade manuals are produced by a number of national trade associations, for example:

- the Architectural Woodwork Manufacturers Association of Canada (AWMAC);
- the Canadian Roofing Contractors' Association (CRCA);
- the Terrazzo, Tile and Marble Association of Canada (TTMAC).

The use of such standards and manuals will reduce the volume of the specifications to a considerable degree.

Where a standard is referenced, the specifier or architect normally verifies that the number is correct, together with the date of the latest issue of the standard or code. If the standard has been amended, the specifier or architect may confirm that the amendments have not changed any significant criteria that would affect the types and uses of the particular product or procedure.

Refer to Chapter 1.2.5, *Standards Organizations, Certification and Testing Agencies, and Trade Associations*.

MasterFormat™

The primary purpose of the MasterFormat™ system is to provide a method to:

- organize information contained in project specifications;
- retrieve all files, costs, product literature, references, and parts of project specifications from a single unified system.

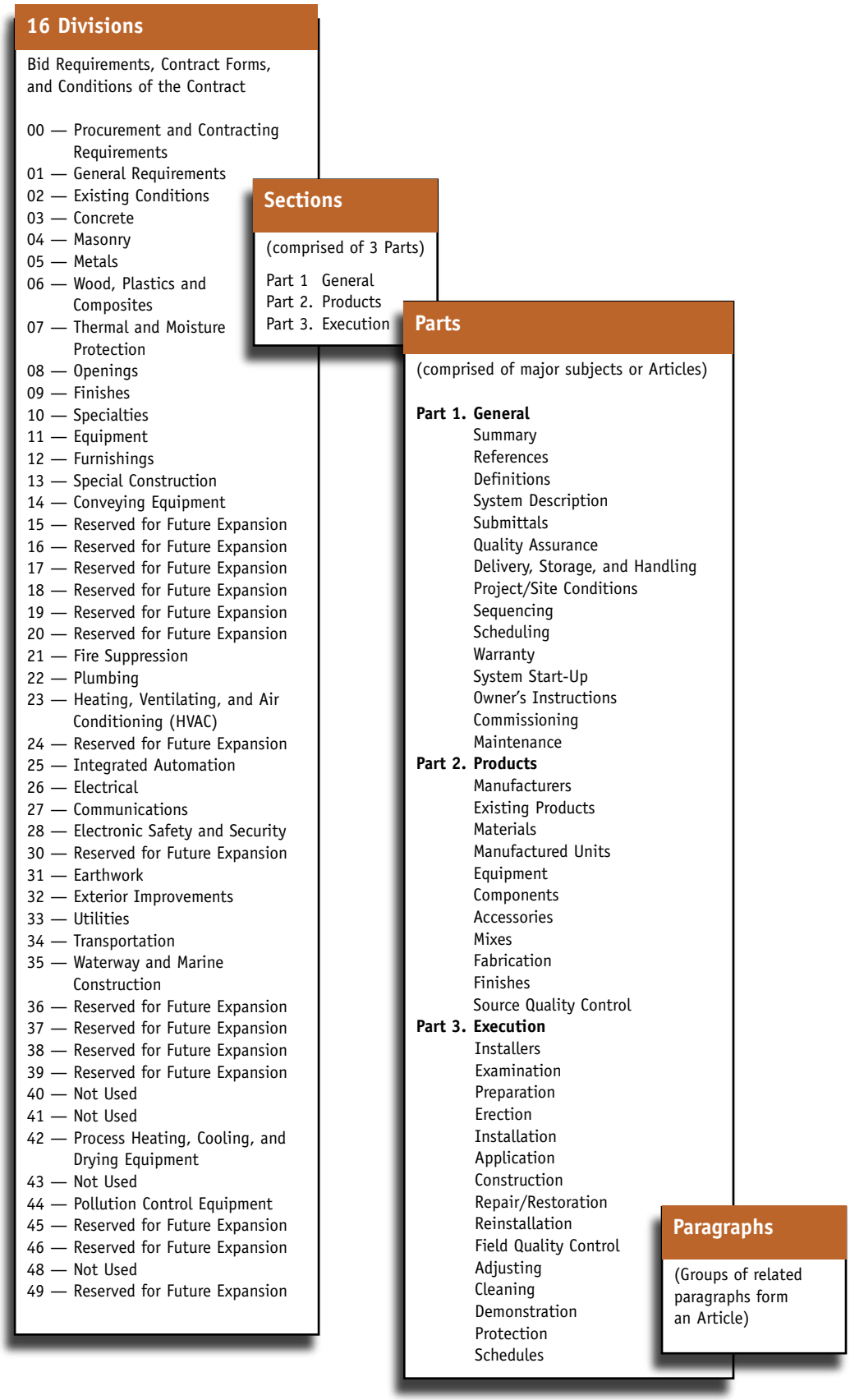
Of the manuals for this purpose, *MasterFormat ™ 2004 Edition, Numbers and Titles* is one of the most widely used. Since 1978, MasterFormat™ has been produced jointly by The Construction Specifications Institute (U.S.A.) and Construction Specifications Canada. Initially conceived in 1963, it has been almost unanimously accepted by the construction industry in the U.S. and Canada.

MasterFormat™ is a system of numbers and titles for organizing construction information into a regular standard order or sequence (refer to Illustration 2). It is organized in the well-known "49 Division" Specification Format, using a six-digit section numbering system. Each section is, in turn, organized according to a three-part format for articles titled: General, Products and Execution. In addition to the 49 divisions and their groups of sections, MasterFormat™ contains what has come to be known as the Series 00 of Documents. It incorporates an organizational structure for documentary information for the Project Manual. Under Division 00 "Procurement and Contracting Requirements" the following is included:

- bidding information and requirements;
- contract forms and bond requirements;
- General and Supplementary Conditions of the contract.

The designation system for the headings for these groupings has been included to standardize the titles, and to allow the storage, search, edit, and retrieval of the various elements. Titles and terminology should be fixed and used in the sequence shown. Any number of additional entries may be inserted by decimal expansion, if required.

Illustration 2: Diagram Illustrating the Framework of the MasterFormat™ System



Note that some titles will be unnecessary under certain methods of construction procurement. For example, bidding information will not be required when the owner is the builder.

The MasterFormat™ system:

- provides a flexible system within a standard framework for fixed sections;
- is adaptable to computer word-processing software;
- allows the user to decide whether to use fixed or flexible section titles.

The guide allows each subject or component to be easily located with the designated, six-digit number.

Using standard titles and numbers results in a higher degree of uniformity within construction specifications. The section titles, given in the index, should be used for either a fixed or a flexible system, using the wording and sequence proposed.

The 49 divisions are titles only, contain no text, and are listed in the table of contents of the specification as a means to search for information contained in sections which are grouped and listed under the heading of that division.

Example: Division 04. Masonry: Section 04 21 13 — Brick Masonry

Every practising architect should use *MasterFormat*™ for producing project specifications and as a basis for an office technical library, for organizing:

- office files of product literature;
- cost data;
- reference material;
- samples.

SectionFormat™

The *Three-Part SectionFormat™ for Construction Specifications* is also produced jointly by The Construction Specifications Institute (U.S.A.) and Construction Specifications Canada. Its primary purpose is to provide a uniform approach for organizing articles and paragraphs within the project specification sections to produce a consistent appearance and completeness, and to facilitate understanding and communication.

Sections, grouped together according to a collection of related work under one of the 49 identified divisions, can be combined and written to suit the project for which they are produced.

Each Section is divided into three **parts**:

- **Part 1, General:**
  This part covers those subjects which:
  - relate to the work in general;
  - provide a general description of the system, where applicable;
  - identify references to standards;
  - define the administrative and technical requirements specific to a particular section.

- **Part 2, Products:**
  This part defines the acceptable equipment, materials, fixtures, mixes, and fabrications, that is, "product" items to be incorporated into the work.

- **Part 3, Execution:**
  This part describes the manner in which items covered by Part 2 are to be incorporated into the work.

The architect should use the *Three Part SectionFormat*™ as a guide in writing specifications sections for *every* project, except for:

- simple outline specifications;
- short specifications for minor projects.

Maintain the established order and sequence of articles even if the three-part format is not used.

Master Specification Systems

Office Master Specification Systems

Many architectural practices use a "master specification" — developed from experience on previous projects — which covers the entire potential scope of building construction, including a large range of options. Computers and word-processing software are widely used for producing specifications and project manuals. Working with the master, the architect or the specifications editor:

- fills in blanks;
- deletes options that do not apply;
- incorporates special requirements not included in the master specification.

Some offices have a specification writer on staff, or engaged on a consulting basis, who takes the contents of the specification, in its raw state as provided by the architect, and edits it into the standard formats and expressions. These specification writers often enter the process during the production of the working documents.

National Master Specification (NMS)

Nationally supported master specifications are widespread in the construction industry. Regardless of the source, the architect assumes responsibility for the specifications issued from the architectural practice.

The NMS is a library of construction specification sections, written in contract specification format. Produced by the federal government in consultation with the private sector, it is the most widely used master specification in Canada. The NMS Secretariat, which is part of Public Works and Government Services Canada (PWGSC), is responsible for the NMS. All data are stored electronically and organized into sections following *MasterFormat*™.

The NMS could be termed a "deletion" master. It allows for the fast deletion of inapplicable portions of the specifications and the reduction of errors and editing time.

The NMS is flexible and suitable for:

- large, medium or small projects;
- new or renovation construction;
- private or public (government) work;
- varying bid or contract arrangements.

It does not restrict the designer from:

- specifying any products;
- using any design concepts;
- employing any construction techniques.

Furthermore, the NMS uses text that is clear, precise, and detailed enough to convey the desired meaning. The NMS also:

- incorporates the accumulated expertise of Canada's foremost authorities on specifications, documents, and construction technology;
- is reviewed by industry to ensure it represents current trade practices and construction technology;
- is regularly updated to incorporate the latest use of recommendations, products, and construction changes, as well as standard and code revisions;
- is undergoing "green" revisions to ensure the incorporation of environmentally sustainable construction practices.

U.S. Master Specification Systems

Masterspec® is the master specification system of The American Institute of Architects (AIA). One of the products of AIA Master Systems used to prepare drawings and specifications, Masterspec® was started in 1972 by Arcom, a division of an architectural firm in Salt Lake City.

Masterspec® provides a wide range of specification products, software and services. *www.arcomnet.com/masterspec/index.php*

Proprietary Systems and Specification Writers

Many independent specification writing firms specialize in the preparation of technical specifications and bidding documents for construction projects, and the preparation of guide specifications for building product manufacturers.

Before selecting one of these firms to provide either a master specification, or a specification developed and written for a single project, the architect should:

- review examples of the work of several firms;
- evaluate the appropriateness of their work for the architect's needs;
- consult references.

Because ownership of the copyright can become an issue, the architect must:

- clarify the client's expectations about ownership of the copyright;
- determine whether the specification consultant expects to retain the copyright of the specification that has been developed and then negotiate an appropriate agreement.

Typically, the copyright of the documents at any stage of their development will be the property of the architect. If an architect chooses to engage an independent specification writer, the architect — as the prime consultant — will be responsible for the specifications but the copyright will rest with the specification writer unless it is assigned to the architect. The architect retains the right to modify the text as provided. In addition to the final hard (paper) copy, an electronic copy should be submitted.

The specification writer or "specifier" should always be well-informed on the progress of the project and current with the production of all documents, including drawings and schedules. This ensures consistency and proper coordination between the specifications and the drawings.

Some specification writers are members of Construction Specifications Canada (CSC). Refer to Chapter 1.2.3, *Consultants*, for a brief description of CSC.

Preparing Specifications

Resources

The maintenance of a comprehensive and effective office library is crucial to preparing specifications. The office library should contain:

- manufacturers' and suppliers' product literature;
- trade association handbooks and design guidelines;
- guides related to contractual and procedural information (such as CCDC Guides);
- research material which provides data on the performance of construction components, assemblies, and systems under various conditions;
- standards (which prescribe the manufacture, performance, and installation of various products);
- national and provincial codes and regulations;
- local bylaws and regulations (such as zoning bylaws).

In cases where a new or unusual product is to be selected, the architect will usually research the product and its specifications. Note that:

- the specifications can only be drafted after the quality and performance of the new product has been evaluated;
- it may be necessary to obtain samples or to conduct site visits where the product has been installed.

Although most manufacturers' representatives are knowledgeable about their products, the architect generally:

- seeks further information;
- reviews the firm's literature;
- asks for test reports from independent laboratories;
- contacts other architects or users who have had experience with the material or product.

Coordination

The architect continually acquires information affecting specifications, and maintains close coordination among all contributing parties during the process of writing the specifications. These parties include:

- the client representative;
- members of the architect's staff associated with the project;
- structural, mechanical, and electrical engineers;
- specialist consultants;
- technical representatives from materials and equipment manufacturers;
- Authorities Having Jurisdiction;
- testing agencies;
- trade associations;
- the cost consultant.

It is important to establish well-defined lines of communication for sharing information among the client, Authorities Having Jurisdiction, the architect's staff, and consultants.

Assembling Specifications Sections

The specifications can be assembled as the project design is developed and the components of the project are identified.

Architects may follow these steps:

- obtain a copy of the master specifications for the section if one is available (alternatively, if the section is new, have

a copy of *Three Part SectionFormat™ for Construction Specifications* to assist in writing);
- review the minutes from project meetings and identify specification items;
- study the latest drawings and schedules and the use of the materials noted;
- attach a checklist to each section listing:
  - action required;
  - questions to be answered;
  - information to be obtained;
- draft the section, marking items to be resolved on the draft;
- coordinate all references to standards and codes to ensure that they are current and appropriate for the product or system application;
- coordinate with other sections and with drawings, when preparing each draft section;
- finalize the draft;
- edit and proofread the text;
- correct and reprint until a final copy is achieved.

Revisions

As the construction documents develop, the architect incorporates a number of revisions into the specifications. The final specifications include:

- design revisions affecting the materials to be used;
- revisions which change the methods by which a material is used;
- changes requested by local Authorities Having Jurisdiction, such as:
  - additional fire-rated protection;
  - the prohibited use of a material in a given situation.

Office Procedures and Standards

Each architectural practice will develop its own standards for formatting, text editing, word-processing, and producing the specification documents. Only the significant points are stated here. Refer to the *CSC Manual of Practice* for a detailed description of procedures.

SectionFormat™
The "section" of a specification is intended to cover a particular subject, component, or unit of work, of the project. The information and instructions contained in the section must be organized in a consistent manner, as recommended in *SectionFormat™*.

PageFormat™
The practice should develop a standard page format for specifications. Some editing software programs provide options which automatically change the page format.

The office standard should:

- maximize use of text area on the page;
- avoid excessive indenting of paragraphs;
- recognize that some clients may require a style and font that differs from the architect's standard.

The text for the printed page must be easy to read, and quickly and thoroughly understood.

Format:

- use the same layout and typeface (font) throughout the document;
- issue clear instructions on format to:
  - in-house staff;
  - consulting engineers;
  - specification writers.

The choice of font is also important for ease of communication. The base font should be easy to read. Provide variations, such as a small increase in size (for headings, for example), bold face, or italics, to emphasize certain components of the text or to highlight certain kinds of information.

Covers should present the practice's image in a professional manner.

Project identification:

- includes project name and contact information;
- includes project number;
- includes date:
  - usually selected by the architect as the completion date of all documents;
  - the date must be the same on **all** bid documents and **all** contract documents;
- is identical on all documents including:
  - drawing title blocks;
  - specifications cover;
  - specifications title page (particularly if cover is blank or contains graphics);
  - covers for separate volumes (schedules, standard details, etc.).

Reproduction and binding should take into account the fact that note specifications are used extensively at the construction site, often in rough conditions and sometimes wet weather.

For information on the number of sets to be printed, see Chapter 2.3.9, *Construction Procurement*.

Specification Language

When writing specifications, follow these well-known maxims:

- be brief and clear;
- use imperative style;
- address instructions to the contractor;
- avoid:
  - repetition;
  - specifying anything which is not to be enforced;
  - *or equal* phrases;
  - *scope* or *scope of work* paragraphs;
  - *weasel* paragraphs (see below).

Use technical terms in such a way as to be understood by a non-specialist. Specifications convey a message to the people responsible for building the project.

1. Use a simple imperative style. Avoid verb forms such as: s*hall be, will be, to be, is to be, are to be, should, should be,* and *may be*. Avoid the word *must*.

2. Make direct positive statements. Make materials and methods the main subject, not *the Contractor*. Write specifications as if the work will be done by **one** constructor. Avoid reference to: *Mechanical Contractor, Plumbing Contractor, Sub-contractor, General Contractor, Main Contractor,* etc.

3. Avoid vague or escape phrases, for example: *as specified, as shown on drawings, specified elsewhere, to the satisfaction of Architect, as Architect may direct, acceptable to Architect, in opinion of Architect*.

4. Avoid "weasel" paragraphs (such as the following actual examples):

   ~~*The contractor shall furnish and include everything necessary for the full and complete construction of the building whether shown or specified or not shown or specified.*~~

   ~~*Any work which would necessarily be required to properly carry out the plans must be considered as included in these specifications, although the same may not be specifically mentioned.*~~

5. Avoid superfluous words such as: *all, any, which, same, and/or*. Avoid using the definite article "*the*" ***or*** the indefinite articles "a" and "an."

6. Avoid the phrases: *workmanlike, high-class job, first-class job,* etc. Describe the end result in known precise terms. Do not specify anything not intended to be enforced or impossible to enforce. Avoid adverbs such as "carefully" or "neatly."

7. Use numbers for numeric quantities. (When a numeral or letter is used as a descriptor as in a list, add a period to distinguish it from a quantity.)

8. Use abbreviations or acronyms if they are well-known in the industry. (Consider including a glossary that spells out abbreviations or acronyms in full.)

9. Avoid the following phrases: *or equal, approved as equal, equal to,* or *just as good*.

10. Avoid repetition — say it once, in the appropriate place.

11. Avoid writing *scope, scope of work,* or *work included* paragraphs. There is a time-honoured rule of law which reads: "Expressio Unus est Exclusio Alterius." This means literally: *The express mention of one thing implies the exclusion of another*.

12. Ensure consistency in style and in the use of terms.

Complete sentences are not necessary in specifications. The information can be conveyed by simply naming the product and relating it to a standard or list of criteria.

For example: *.2 Acoustic units: to CAN/CGSB-92.1, 24" x 24", mineral fibre, 3/4" thick*
NRC range .65 -.75, colour white — face cut pattern

or: *.2 Acoustic units: 'Acoustone' Glacier, by CGC — colour white*

The Bid Package

Refer to "List: The Bid Package — A List of Information Required," Chapter 2.3.9, *Construction Procurement*.

Addenda

Addenda are revisions to the specifications and drawings prepared during the bidding period. Refer to Chapter 2.3.9, *Construction Procurement*.

Definitions

Bid Documents or ***Bid Package:*** The compilation of documents, issued by the architect, and used by bidders to prepare an offer to construct a project. The bid package consists of the following:

- bidding requirements (including instructions to bidders);
- contract forms;
- contract conditions;
- specifications;
- drawings (including schedules);
- addenda.

Division: A major element or heading of the specification under which are grouped sections describing similar and related work. The division contains no text except that which is presented in the sections. The MasterFormat™ system has 49 divisions.

Generic: This term means that the product is identified by a common name and, possibly, by general type.

Part: One of three parts in a section which deals with a particular aspect of the work described in the section. These three parts are called General, Products, and Execution.

Product or Products: The material, machinery, equipment, and fixtures forming the Work, but does not include Construction Equipment. (as defined in CCDC 2, *Stipulated Price Contract*).

Section: An element within a division which describes a particular unit of work.

References

Canadian Construction Documents Committee (CCDC). CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts*. Ottawa, Ont.: CCDC.

Construction Specifications Canada (CSC). Toronto, Ont.
www.csc-dcc.ca

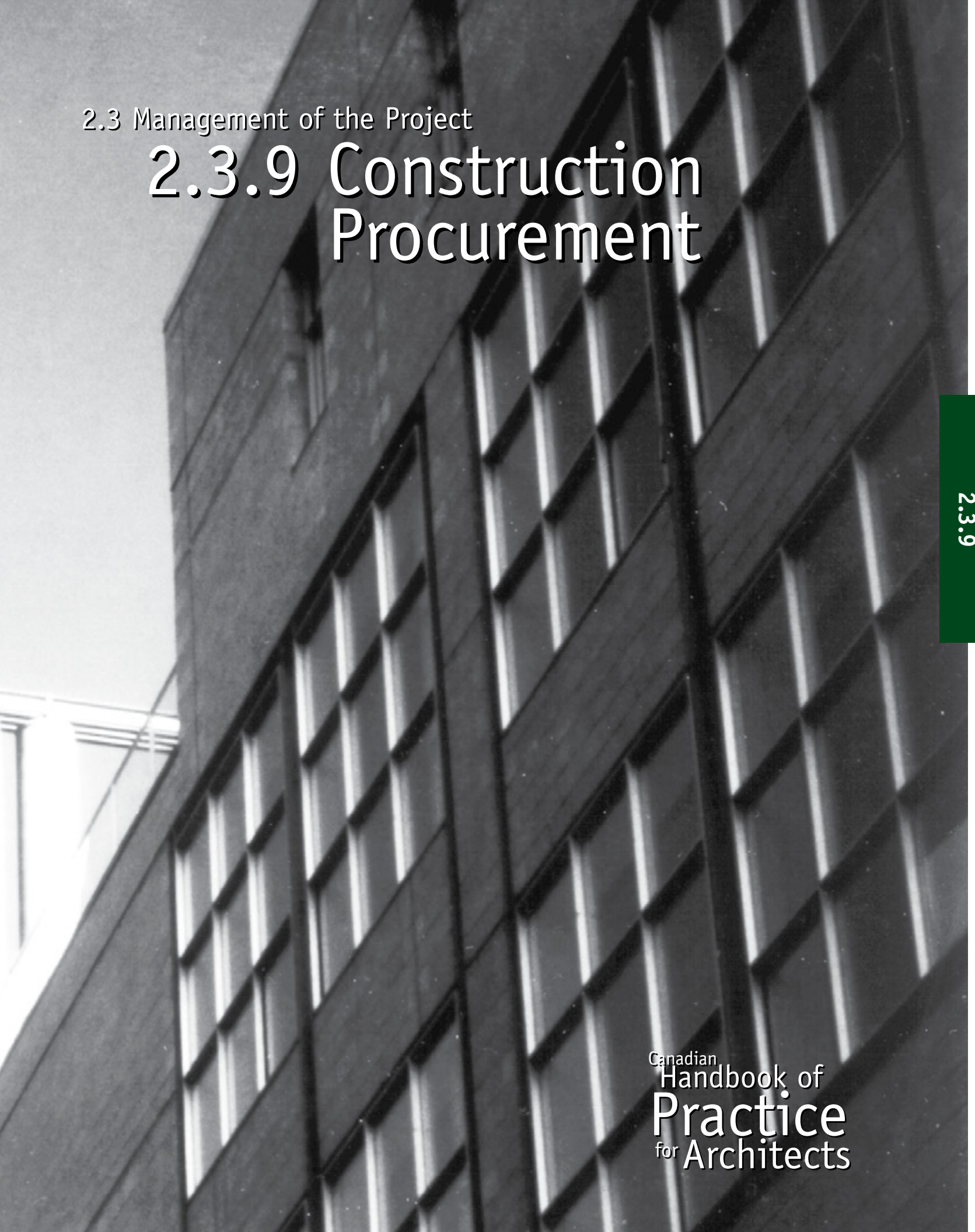
Construction Canada. A monthly journal.
Manual of Practice, 2006
An Alphabetized Word List of Definitions, Defined Terms, and a Glossary
SectionFormat™ / PageFormat™, 2008
MasterFormat™
UniFormat™
Specifier's Guide to Metric Conversion in Specifications
TEK.AIDs
Workbook for Product Representatives

Demkin, Joseph A., executive editor. *The Architect's Handbook of Professional Practice*. The American Institute of Architects. Hoboken, New Jersey: John Wiley & Sons, Inc. 2008.

Stitt, Fred A., *Construction Specifications Portable Handbook*. McGraw-Hill. New York, New York, 1999.

Checklist: Assembling and Writing the Specifications

- ❑ Attend all project team meetings, including those with consultants.
- ❑ Obtain and review a set of design development drawings and, if one has been prepared, a set of outline specifications. Obtain and review sets of partially complete working drawings and updates as soon as they are available.
- ❑ Prepare files marked for bidding requirements, contract forms, conditions of the contract, and Divisions 1 to 16.
- ❑ Select appropriate sections from *MasterFormat*™ to be drafted. Prepare preliminary table of contents.
- ❑ Print draft copies of master sections or suitable sections from a previous project.
- ❑ File the draft copies.
- ❑ Mark up or develop a checklist of information required.
- ❑ Draft, print, and distribute preliminary table of contents for review by project team.
- ❑ Draft or assemble specification sections manually, or draft and edit directly using word-processing software.
- ❑ Coordinate each section with other sections as applicable (including sections within Divisions 15 and 16).
- ❑ Submit drafts to clerical personnel for typing and application of text editing software, or print out directly from word-processing software.
- ❑ Proofread printed section(s).
- ❑ Print and distribute copies for review by project team.
- ❑ Review and revise project sections in accordance with:
  - comments from others;
  - latest drawings;
  - latest information received.
- ❑ Update the table of contents to match revisions and additions.
- ❑ Prepare title page which includes:
  - project name and address/location;
  - project number;
  - date.
- ❑ Prepare specifications cover.
- ❑ If required, print preliminary copies for client's review and comments. Revise as necessary.
- ❑ Coordinate printing of specifications. Securely bind specifications, including front and back cover.
- ❑ Assemble bid documents (described in Chapter 2.3.9, *Construction Procurement*).
- ❑ Review the drawings and specifications during bid period. Draft corrections of omissions and clarifications of inconsistencies. Advise other members of project team.
- ❑ Review all architectural items found, or raised as queries, during bid period. Collect structural, mechanical, and electrical items from consultants. Coordinate all items and prepare addenda. Number each addendum consecutively. Issue each addendum. (Refer to Chapter 2.3.9, *Construction Procurement*.)



2.3 Management of the Project

2.3.9 Construction Procurement

2.3.9

Canadian Handbook of Practice for Architects

2.3.9

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Construction Procurement

Introduction

This chapter discusses various methods of **selecting** contractors and awarding construction contracts. For a complete guide to the bid process, refer also to CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts*.

Clients, with the help of architects, **select** a general contractor for construction projects by using one of the following common methods:

- open competitive bids (sometimes called public tender);
- invited competitive bids (sometimes called invited tender);
- direct selection.

In addition to contractor selection, there are a variety of other **contracting** methods as well as methods of project delivery. For these various methods, refer to Chapter 2.3.2, *Types of Construction Project Delivery*.

One of the architect's responsibilities under the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six*, is to "assist and advise the Client in obtaining bids and negotiated proposals and in awarding and preparing contracts for construction." This service may be extensive. On the other hand, if the client is an expert in construction procurement, this assistance may be limited to only providing information and advice.

Obtaining Bids

At the outset of the project, the architect and the client must determine:

- the form of project delivery;
- the type of construction contract;
- the method for awarding the contract.

These decisions affect:

- the architect's scope of services and fees;
- the project schedule;
- the preparation of construction documents and bid documents;
- the bidding process.

For example, a stipulated price contract, with a single bid call, is much simpler to manage than a contractual arrangement with multiple bid packages at various stages of the project.

To ensure that all contractors are bidding on a comparable finished product, bidding for stipulated price contracts with general contractors occurs *after* all construction documents (including drawings and specifications) have been completed. All criteria for the selection of the successful bidder and award of contract must be included in the bid documents.

Open Competitive Bids (or Public Tender Call)

In this type of tender call, the bidders are not usually "screened" or otherwise pre-qualified, and the capability of the contractor may be uncertain. The contractor may be selected on price alone. This type of tender call is frequently used when the project involves public funds.

A Notice of Tender is often prepared and is advertised on various websites or electronic tendering services, in daily newspapers and construction journals. The Notice should contain the following information:

- name and location of project;
- name of the client and the architect;
- size and type of project;
- bid closing date;
- method for obtaining bid documents;
- bid security requirements (such as a bid bond or deposit);
- date and location of pre-bid meeting, if necessary;
- construction start and completion (if relevant);
- form of contract.

The Notice enables contractors to decide whether or not they are interested in the project.

Invited Competitive Bids (or Invited Tender Call)

When inviting bidders, the client may select contractors with whom the architect or the client has had a satisfactory experience; alternatively, the client and the architect may select bidders by pre-qualification. Architects often assist the client in assessing the capacity and previous record of contractors and sub-trades who might be invited to bid on the work.

At the outset, pre-qualification helps to eliminate candidates who do not demonstrate that they have the necessary financial capacity, relevant experience, and human resources for the project at hand. Refer to CCDC 11, *Contractor's Qualification Statement*. Once pre-qualified, bidders should generally be considered to be equal in competence and the contract should then be awarded to the lowest bidder.

Prequalification can have its pitfalls, and architects may wish to establish and use clear and transparent criteria when selecting or eliminating contractors to avoid being accused of favoritism.

Invited bids are typically used for the following projects:

- projects with private clients who prefer to select from a group of proven contractors;
- specialized projects that require particular expertise;
- small projects that might not attract the attention of contractors if they were advertised publicly.

Direct Selection

It is always possible for clients to negotiate a contract with a single contractor, especially a contractor with whom a relationship of trust has been established over time. Clients and architects (possibly with the assistance of a quantity surveyor) should ensure that detailed construction cost estimates have been prepared as the basis for beginning negotiations. During negotiations, the contractor may propose changes or alternatives which must be evaluated and agreed upon. Negotiated contracts are based on mutual trust and full disclosure of all estimates and quotations. Direct selection and negotiation often lead to the following forms of construction contract:

- stipulated price (such as CCDC 2, *Stipulated Price Contract*);
- cost plus, or cost to a guaranteed maximum price (such as CCDC 3, *Cost Plus Contract)*;
- construction management contracts.

Bonds

In the construction industry, a bond is an instrument which permits a contractor to provide an owner with a guarantee from a bonding company, known as a surety. The guarantee ensures that the contractor satisfactorily performs his/her obligations under a contract. Bonds are a "useful means of ensuring responsible contract performance and financial security and, consequently, are often an essential requirement in construction procurement today" (CCDC 22, *A Guide to Construction Surety Bonds*). A bond is not an insurance policy but instead a three-party undertaking whereby the surety agrees to indemnify the owner against loss arising from the failure of the contractor to perform obligations under contract.

The architect should be familiar with the various types and applications of bonds in the construction industry. Refer to CCDC 22, *A Guide to Construction Surety Bonds*, for further information.

In preparing the bid documents, the architect may advise the client of the type and amount of bonds appropriate for the project. For construction contracts, three bonds are of particular importance:

- bid bond;
- performance bond;
- labour and material payment bond.

Bid Bond

The bid bond submitted by the contractor (bidder) guarantees that if the bid is accepted within the time period stated, the contractor will enter into a formal contract with the owner. If the contractor fails to enter into a contract, the surety will guarantee — up to the amount of the bid bond — to pay the difference in money between the amount of the contractor's bid and the amount for which the owner legally contracts with another contractor for the project. Bid bonds are usually between 5% and 10% of the estimated construction cost; on very large projects, 2½% is considered an appropriate amount.

The architect may wish to consider other forms of bid security:

- certified cheque;
- irrevocable letter of credit from a financial institution;
- negotiable securities (in rare instances).

Frequently, smaller contractors — who do not have the financial capacity to obtain bid bonds — may be appropriately qualified for small or specialized projects. In these cases, other forms of bid security should be considered.

If a bid bond is selected as the appropriate form of bid security, the use of CCDC *Form 220, Bid Bond*, is recommended.

Performance Bond

The function of a performance bond is to indemnify the owner up to the amount of the bond in the event of default (bankruptcy or insolvency) on the part of the contractor. In the event of a contractor's default, the performance bond will cover the costs of completing the contract as well as other costs for which the surety is liable, up to the total amount of the bond. Frequently, the amount of a performance bond is based on a percentage of the contract amount, such as 50% or 100% of the contract amount.

Bid bonds do not ensure that a surety will provide the necessary performance bond once the bid is accepted; therefore, it is prudent to request a separate undertaking signed by a surety company to issue a performance bond if the contractor is awarded the contract. This undertaking is usually in the form of a letter signed by the Surety and may be called a "Consent of Surety" or "Agreement to Bond" or "Bid Letter".

A performance bond will not cover payment of labour and material claims.

The use of CCDC *Form 221, Performance Bond*, is recommended for performance bonds; however, many sureties have their own type of documentation.

Labour and Material Payment Bond

A labour and material payment bond guarantees that claimants (sub-contractors, sub-trades, and suppliers who have direct contracts with the contractor) will be paid for labour and materials provided to the contractor for use on the project identified in the bond.

The use of CCDC *Form 222, Labour and Material Payment Bond*, is recommended; however, many sureties have their own type of documentation.

Refer to CCDC 22, *A Guide to Construction Surety Bonds*, for further information.

Preparing the Bid Package

The package sent to bidders to prepare their bids is made up of the components outlined at the end of this chapter. See "List: The Bid Package — A List of Information Required."

In preparing the bid package, the architect should refer to CCDC 23, a *Guide to Calling Bids and Awarding Construction Contracts*. The excessive use of Supplementary General Conditions should be avoided in the preparation and use of CCDC documents. The CCDC will not endorse any Supplementary General Conditions; the modification of CCDC contracts by way of addition, deletion or revision should be kept to a minimum and only considered after thorough review. Users are cautioned to avoid arbitrary revisions which may weaken the documents' provisions and also create serious problems.

Occasionally, special circumstances require special bid packages and additional information for the bidders. Architects may need to provide bidders with information on the details of pre-awards, pre-purchased materials, and the responsibilities which the successful bidder must assume. (Refer to the "Definitions" at the end of this chapter.)

Some examples include:

- special insurance and indemnification requirements;
- the client decides to advance construction by awarding a construction contract(s) for a portion of the work, such as foundations;
- some materials or products or systems are pre-purchased for incorporation into the project;
- pre-award contracts for structural steel or certain mechanical and electrical components;
- some equipment has been purchased directly for future installation in the building (this is typical for hospital equipment which must be installed under sub-contract to the general contract).

Refer also to Chapter 2.3.8, *Construction Documents — Specifications*.

Privilege Clauses

In the past, it was customary for owners and architects to exercise some control over the tendering process by inserting a "privilege clause" in the bid package. A typical privilege clause read as follows:

> *The lowest or any tender shall not necessarily be accepted.*

This type of clause is no longer appropriate. It was believed that this clause allowed owners to justify a decision to award a contract to someone other than the lowest bidder. A decision from the Supreme Court of Canada, issued in April 1999, has provided a final interpretation on this part of the law of tendering. Owners are expected to award a contract in accordance with the terms and conditions of the tender call and not to provide an unfair advantage to one bidder. Accepting a qualified or non-conforming bid is considered a breach of the duty of fairness to all other bidders. A privilege clause does not permit the owner to accept a non-compliant bid.

Architects should review Section 2.0, Principles of the Law of Competitive Bidding of CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts*.

In preparing tender documents, it is essential to indicate the following in the Instructions to Bidders:

- the requirements for a compliant bid;
- whether or not bids may be withdrawn and under what circumstances;
- whether or not, and the extent to which, pre-award negotiations will be permitted;
- all criteria for selection of successful bidder.

It may be prudent to look for direction from construction lawyers and from the provincial associations of architects for advice on the preparation of bid packages.

Distribution of Bid Documents

Usually, the Notice of Tender indicates where, and under what conditions, contractors can obtain the bid documents. The administration and distribution of the bid documents can be a service provided by the architect or alternatively, in the case of an experienced or sophisticated client, it may be the client's responsibility.

Number of Sets of Bid Documents

Clients, consultants, contractors, and sub-contractors all have vested interests in a having easy access to the drawings and specifications during the bid period. Limited electronic access or too few printed sets may reduce exposure of documents to sub-trades and suppliers, and perhaps reduce the number of competitive prices.

When determining how to distribute bid documents electronically and how many sets of hard or paper copies to print, architects should consider the following factors:

- requirements of the client and consultants;
- requirements of Authorities Having Jurisdiction;
- type and number of electronic tendering services, such as CANet and Merx;
- sets for construction association plan rooms;
- size and complexity of projects (number of trades involved);
- number of contractors and sub-contractors expected to bid;
- sets required for execution of the contract.

It is important to always issue complete, and not partial, sets of the bid documents.

Client-architect agreements should not stipulate the number of sets to be included in the fee. Printing drawings and specifications are reimbursable expenses. If clients insist that a minimum number of sets be included in the fee, the architect should adjust the fee accordingly. Fee arrangements should also be made for the formatting, dissemination, and distribution of electronic data.

Tracking the distribution of bid documents and addenda is important. A typical "Bid Documents Distribution List" is provided in Chapter 2.4, *Sample Forms for the Management of the Project*.

Deposit

Contractors customarily obtain bid documents by providing a deposit to ensure their safe return. The deposit amount is generally the cost to reproduce a full set of documents plus a nominal handling charge. The deposit is refunded when bid documents are returned within a specified

time, provided that the documents are complete and in good condition. Sometimes, documents are provided *at cost* plus an administrative charge to any general contractor, trade contractor, supplier, etc., without the return of any funds.

Construction Associations and Bid Depositories

Access to information is critical and should be easily obtainable to ensure the best bids. A complex or large project may require the distribution of extra or additional sets of bid documents or the use of an electronic tendering service. All bid documents may be provided to construction associations, particularly for large projects and for projects which have significant sub-trade components.

A bid depository is a facility operated by the local construction association to collect and register bids from sub-contractors and suppliers, and then transmit these sub-trade bids to general contractors. Usually, these quotations for the general contractors' use must be submitted within a specified time period before the bid closing. The rules may be confirmed with the local bid depository. Refer to Chapter 1.2.1, *The Construction Industry*, for a brief summary of the role of bid depositories.

Addenda

A detailed analysis of the documents by contractors, sub-trades, and manufacturers — in preparation of their bid — may reveal omissions or contradictions in the project documents or items which need clarification or correction. The architect and engineers may also discover inconsistencies or omissions. Additional products which are approved as alternatives may have been identified. Moreover, the client may wish to make minor changes to the project. When questioned about the documents, the architect should be careful to issue new information **only in writing** to all bidders and others, including construction associations, bid depositories, the client, consultants, and authorities.

In the cases described above, the architect should prepare "addenda" to the bid documents. The addenda modify or interpret the bid documents. The addenda may include both text and drawings, or text only. Each addendum should be numbered and dated, and becomes part of the contract documents when the construction contract is executed. Engineering addenda should be forwarded to bidders through the architect, and the numbering of these addenda should be integrated with the architect's system. The new information should be set out very precisely so that bidders know exactly what is original and what has been added, deleted or changed. All bidders should base their bid on the same information.

When organizing addenda, architects can assist bidders and contract administrators by following these procedures:

- identify all addenda by project name and project number;
- provide a date of issue for each addendum;
- number addenda consecutively;
- record the information in a logical order (following the sequence established in the drawings and specifications);
- use simple, clear instructions such as:
  - **Delete:**
  - **Add:**
  - **Revise to Read:**
- reference all attachments to the addendum, providing a drawing and detail number as well as the specification section followed by the article and paragraph number;
- refer to the attachment in the addendum.

A sample Addendum is provided in Chapter 2.4, *Sample Forms for the Management of the Project*.

The last opportunity for issuing an addendum should be no later than four working days before bid closing. The same written instructions should be received in a timely manner by all bidders. If this is not possible, consideration should be given to extending the bid period.

Bid Period and Bid Closing

To ensure that clients receive competitive prices, contractors must have adequate time to review the bid documents and to prepare a bid. The length of the bid period will vary, based on the project size and complexity. A large, complex project "out for Public Tender" may require four to six weeks for bidding, whereas a simple, small project by invited bid may only require two weeks. Market conditions can affect the bid period; for example, several projects being bid at the same time may require a longer bid period.

It is not recommended to receive bids in more

than one location. It is increasingly common for bids to be received electronically and architects are advised to refer to Section 7.8 of CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts,* for information on principles which apply when receiving bids electronically.

It is not recommended that bids close on a Friday or a Monday, nor immediately following or preceding a statutory holiday. Usually, the time for closing bids is mid- to late-afternoon. It is important to specify the time as *"before"* the hour, not *"on"* or *"at"* the hour. Here is an example of a well-worded instruction:

> **Bids must be received *before* 3:00 P.M. on Thursday, February 19, 2009.**

The person receiving the bid should time-stamp, date-stamp, and initial the bids on receipt at the designated place of closing. Bids received after the designated bid closing time should be returned unopened to the bidder indicating that it was a late bid. No reasons for the lateness (such as accident or traffic jam) can be accepted. On the other hand, if an external cause such as a snow storm has prevented the majority of expected bidders from tendering their bids, the closing of the bid call may be postponed, in which case the bids that were received should be returned to their senders unopened.

Ideally, bids should be opened soon after the bid closing time. Frequently, bids for public and for some private projects are opened with the bidders, or their representatives, present. Only the following information should be announced:

- bidder's name;
- the *base bid amount only*;
- the required bid security or bid bond.

Alternative prices and unsolicited prices should not be reported. Alternative prices require analysis; reporting them at this time could mislead bidders.

A form entitled "Summary of Bids" is provided in Chapter 2.4, *Sample Forms for the Management of the Project*. Both the architect and the client may find this form useful for recording bids during the bid opening.

Infrequently, after the bid closing, a bidder may notify the architect or the client that a serious mistake has been made in the bid and this contractor should be permitted to withdraw without penalty. However, the submission of a bid is a legally enforceable contract between the bidder and the owner. Based on the conditions of the "bid contract," bidders are unable to withdraw their bids during the period of irrevocability (usually the period provided for in the bid bond). To do so would permit the forfeiture of the bid deposit or bond. Legal advice is required in such an instance. CCDC 23 indicates that if "the bid-calling authority is satisfied as to the existence of a genuine and significant mistake, the bid should not be accepted and the bidder should not be penalized even though the Owner *may* have the legal right to accept the bid."

If only one bid is submitted, the architect should advise the client to consider returning the bid unopened, or negotiating with the sole bidder.

Refer to CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts*, for more information on bidding.

Analysis of Bids

If part of the agreed-to services, the architect may assist the client in analyzing the bids and reporting, however it is the client who will select the successful bidder.

The architect will carefully review each bid. Prior to reporting to the client, the architect should analyze and research:

- the completeness of each bid;
- the bid amount and the amount of value-added taxes such as GST, HST or QST;
- the proposed construction start date and schedule;
- inclusion of all addenda;
- sub-contractors listed, including follow-up of the references;
- manufacturers and suppliers listed with follow-up as required;
- alternatives;
- unit prices.

It may be helpful to follow up with the architects involved on previous projects given as references by the low bidders. Finally, the architect will carefully review and compare the financial impact of any alternatives or substitutions or unit prices.

The architect should report in writing the findings of the bid analysis, including a comparison of all price and bid information, and recommend a course of action (that is, usually the selection of a contractor that most closely meets the applicable criteria) to the client.

Bid Types

Bids are described in the following two terms:

- compliant bid;
- non-compliant bid, that is any irregular bid that might be considered informal, non-responsive, incomplete, improperly qualified or conditional.

Any bid is considered non-compliant if:

- it does not meet the basic requirements concerning confidentiality (for example, being in a sealed envelope);
- it does not indicate that the correct number of addenda were received and included in the bid amount;
- it is not accompanied by the requested bid bond or bid security;
- it is not properly signed or sealed;
- bonding requirements are not submitted (for example, "Consent of Surety" or "Agreement to Bond").

Refer also to CCDC 22, *A Guide to Construction Surety Bonds*.

Any bid deemed non-compliant should be rejected.

Over Budget

When the lowest of the formal bids is higher than the most recent construction cost estimates and the client does not wish to revise the budget or abandon the project, there are two possible solutions:

- if the difference is more than 15% of the latest approved construction cost estimate, the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six* states that architect, if requested by the client, will revise the construction documents and administer a new tender call, at no additional fee;
- if the difference is less than 15% of the latest approved cost estimate, it is generally possible to propose alternatives and to negotiate an acceptable price with the lowest bidder.

Contract Award

Letter of Acceptance

The award of a contract is usually accomplished by issuing a Letter of Acceptance from the client. This letter allows the contractor to start work immediately while a formal contract is drafted and executed. Bids must be accepted or rejected as submitted. The architect frequently assists the client in the preparation of the Letter of Acceptance; however, it is prudent to advise the client to have the Letter of Acceptance and the subsequent construction contract reviewed by the client's lawyer.

Chapter 2.4, *Sample Forms for the Management of the Project*, provides two sample Letters of Acceptance:

- Sample Letter 1: outlines some of the documentation required before commencing work on the site;
- Sample Letter 2: has some qualifications, notably the acceptance of certain alternative prices.

Some clients request that the architect assist them in issuing a "Letter of Intent" to the contractor to advise the contractor of the intention to award a contract. A Letter of Intent, which is issued with the intention of binding the contractor to the project with no real commitment, can be misleading. Letters of Intent should be avoided in favour of a Letter of Acceptance.

Notification of Unsuccessful Bidders

Unsuccessful bidders should be notified promptly of the contract award; this permits contractors to make arrangements with bonding companies, staff, and sub-contractors to bid on other projects.

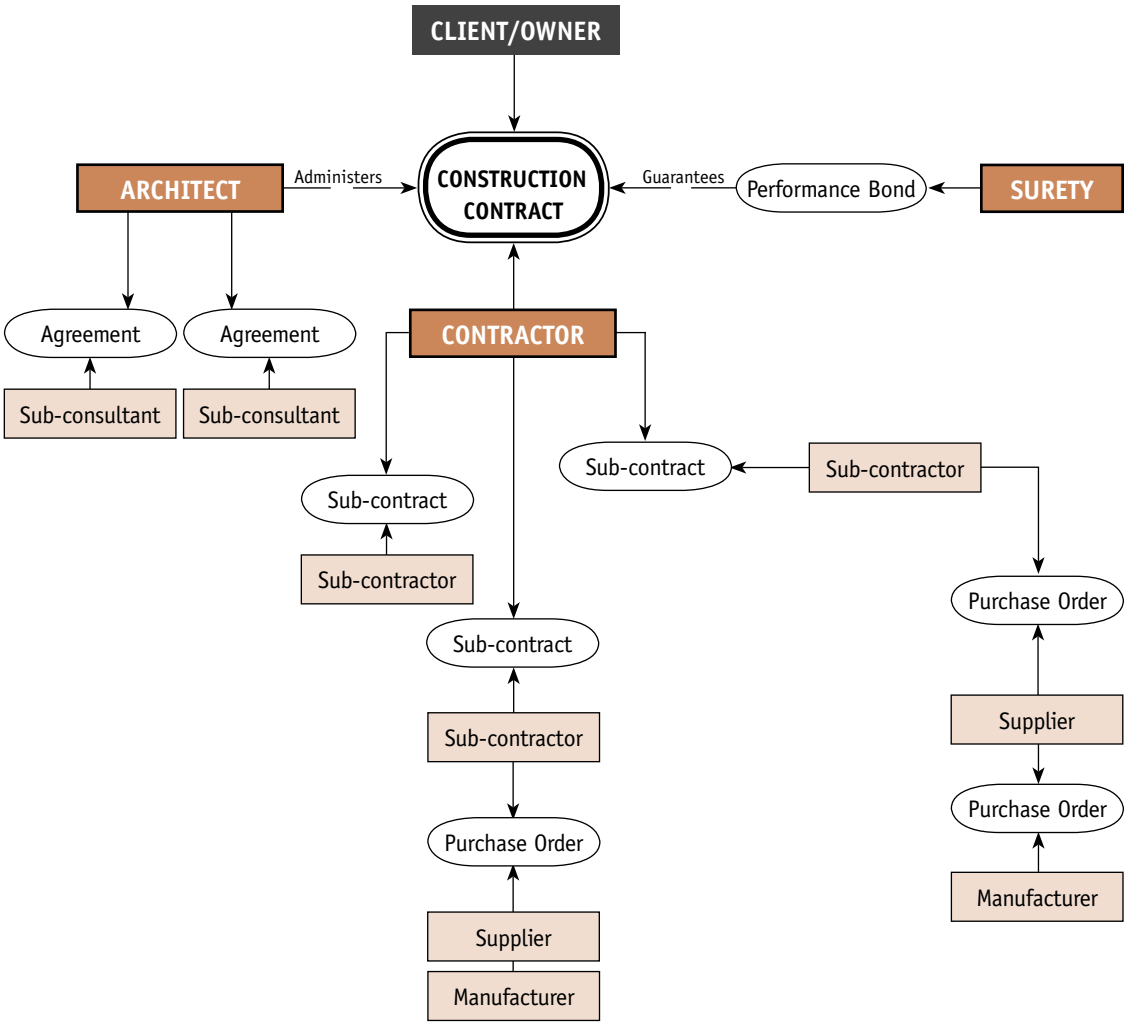
A sample Letter to Unsuccessful Bidders is provided in Chapter 2.4, *Sample Forms for the Management of the Project*.

Preparation of the Construction Contract

The architect usually prepares the construction contract. It is recommended that the standard Canadian Construction Documents Committee (CCDC) forms of construction contract be used. These documents have widespread acceptance in the construction industry, and have been tested and endorsed by all CCDC constituent members.

The Construction Contract

(Relationships in a Stipulated Sum Contract such as CCDC 2)



Refer to Chapter 1.2.1, *The Construction Industry*, for a description of CCDC and "List: Canadian Construction Documents."

The number of copies of the contract to be executed depends on the client and the client's lawyer. A minimum of two original copies (with CCDC authorization seals) should be prepared — one for the client and one for the contractor — as well as one photocopy for the architect. The signatures (and corporate seals) should be applied to both original copies. CCDC 20, *A Guide to the Use of CCDC 2*, describes the method for filling in and completing the agreement form in CCDC 2, *Stipulated Price Contract*.

Some lawyers recommend binding and sealing the documents to make it difficult to remove and replace pages without breaking the seal. Two sealing methods are:

- a ribbon or cord through each page with a wax seal on the cover;
- wire and lead seal.

Less formal methods may be acceptable for smaller projects.

To execute the contract, both the client and the contractor should sign and seal the covers of the documents including the cover page of the drawings and the specifications. Sometimes, every page of the supplementary conditions and occasionally all the drawings are initialled. A contract set is then provided to the client and to the contractor for their records.

Definitions

Addendum: A change to the bid package (usually a modification of the drawings and specifications) issued during the bid period and before execution of the contract.

Base Bid: The stipulated sum of money *without any adjustment as a result of alternative prices or substitutions, etc.,* for which the bidder offers to perform the work called for in the bid documents.

Bid or ***Tender:*** An offer in response to a bid or tender call; a price and/or time estimate in response to a bid or tender call; the offer forms a "bid contract" until the time period for acceptance is over. "Tender" and "bid" are used interchangeably; however, the CCDC formally abandoned the term "tender" in the early 1980s in favour of the term "bid."

Bond: A financial security for the performance of an obligation; usually a written document supported by a pledge of collateral.

Guarantee: a promise to answer for payment of a debt or performance of an obligation if the person liable in the first instance fails to make payment or perform the obligation (to be enforceable, must be evidenced in writing). *from the Carson's Construction Dictionary – Law and Usage in Canada*.

Pre-purchasing: A procedure for purchasing materials, equipment or services by the owner prior to award of the prime contract.

Pre-selecting: A procedure used by an owner to pre-qualify and select a manufacturer or supplier before the tender or award of the total contract.

Pre-tendering: A procedure for calling tenders by the owner prior to the prime contract tender call. The contractor may then be directed to include the amount of this pre-tender in his/her own tender.

Surety: The party (surety company) that issues a bond which guarantees the performance of the person bonded (in construction, the contractor) to fulfil obligations under contract within the financial and time limitations stated in the bond.

Warranty: a statement of fact or quality intended to be relied upon by another party, carrying with it an implied or express promise to make good any breach. *from the Carson's Construction Dictionary – Law and Usage in Canada*.

References

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.

CCDC 2, *Stipulated Price Contract*.

CCDC 3, *Cost Plus Contract*.

CCDC 5a and 5b, Construction Management Contracts.

CCDC 11, *Contractor's Qualification Statement*.

CCDC 20, *A Guide to the Use of CCDC 2 — 1994. Stipulated Price Contract*.

CCDC 22, *A Guide to Construction Surety Bonds*.

CCDC 23, *A Guide to Calling Bids and Awarding Contracts*.

CCDC 220, *Bid Bond (form)*.

CCDC 221, *Performance Bond (form)*.

CCDC 222, *Labour and Material Payment Bond (form)*.

Construction Specifications Canada (CSC). Toronto, Ont.
www.csc-dcc.ca

Manual of Practice, 2006

List: The Bid Package — A List of Information Required

1. Bid Information and Requirements

- Instructions to bidders (see list over)
  - Bid form[1]
  - Bid security requirements (bid bond, or other)
  - Undertaking to bond (agreement to bond, consent of surety, bid letter, etc.)
  - Pre-bid information and meeting

2. Contract Forms and Bond Requirements

- Model contract, including general conditions
- Supplementary conditions:
  - Insurance requirements
  - Performance bond, labour and material payment bond requirements, etc.
  - Cash allowances
  - Contingency allowances, if any

3. Specifications

- General requirements (Division 01)
- Technical specifications (Divisions 02 to 49)
- Independent testing and investigations requirements

4. Site Information (as per project requirements)

- Plan of public utilities
- Legal and topographic surveys
- Geotechnical report[2]
- Environmental report(s)

5. Drawings

- Drawings and details
- Schedules, including room finish schedules, door schedules, etc. (these may be bound with the specifications)

6. Construction Scheduling Restrictions and Milestones

- phasing and occupancy requirements

7. Addenda

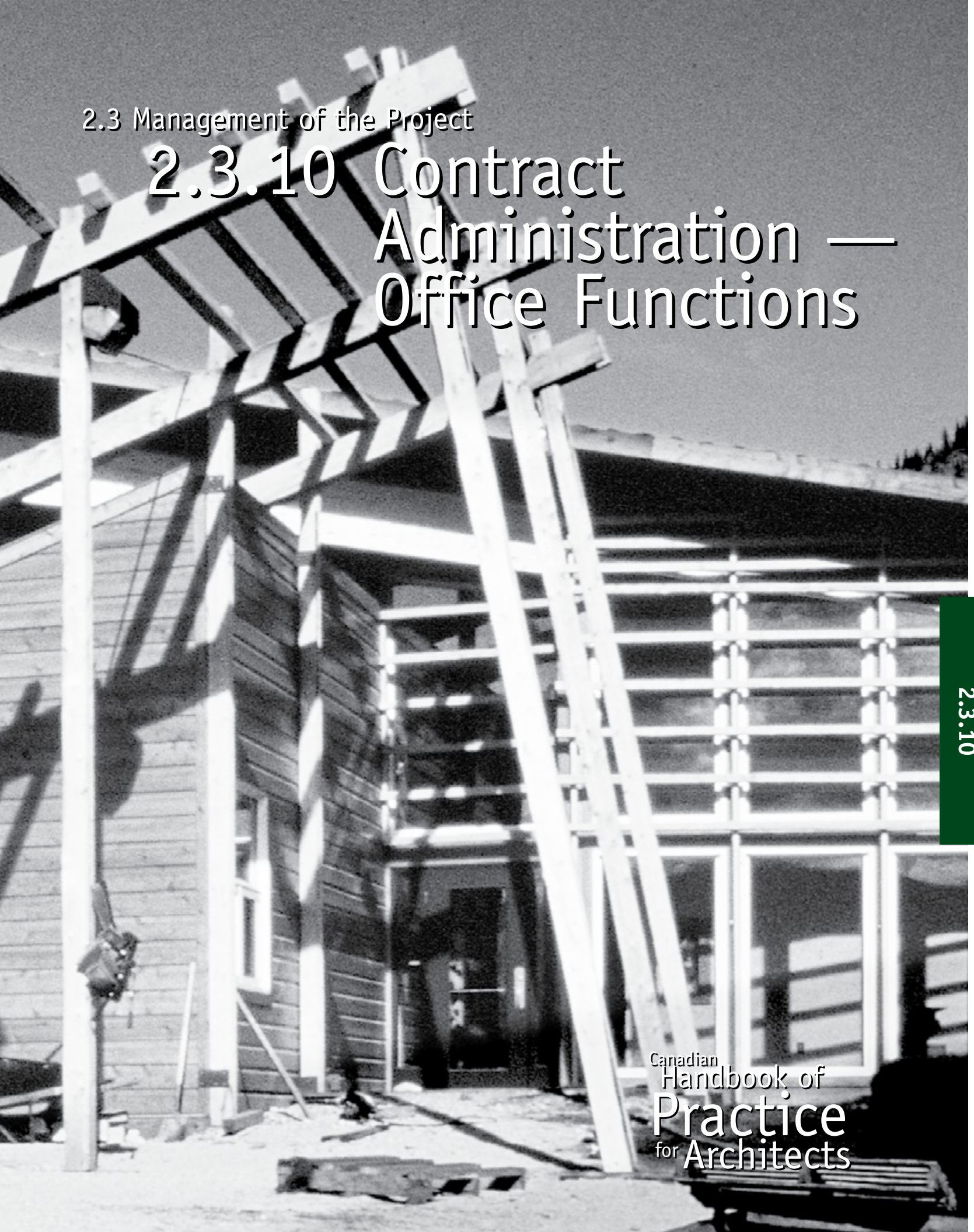
Footnotes:

1. Ensure that the amount of **tax** is clearly included or itemized.
2. Geotechnical and other reports are not generally provided to all bidders but may be consulted at architects' or engineers' offices. Refer to the *Recommended Guidelines for the Provision of Geotechnical Information in Construction Contracts*, published by the Canadian Construction Association and the Association of Canadian Engineering Companies.

List: Instructions to Bidders — A List of Information to be Provided

(refer also to CCDC 23)

- A copy of the project announcement and the invitation to contractors to submit bids (Notice of Tender)
- Location, date, and time of bid closing
- The legal names, titles, addresses, and contact numbers of the client and the client's representative
- The legal names, titles, addresses, and contact numbers of the architect and the architect's representative
- Location and address of the work
- Precise name of the project and a general description of the scope of the work
- Location where the bid documents may be obtained and the requirements for deposit
- Location or website where the bid documents may be examined
- Information regarding the use of bid depositories (when applicable)
- Information about the procedures for requesting information and the distribution of addenda
- Details of an information session or site visit, if required
- Details of a public bid opening (when applicable)
- Pre-qualification requirements
- Period of time for acceptance of bid (duration of offer)
- Bid security required (bid bond, certified cheque, letter of credit, or other)
- Other bonding or security requirements (agreement to bond, performance bond, labour and material payment bond)
- Instructions regarding amending the bid prior to bid closing time
- Details for the signature and witnessing, especially if not incorporated
- Identification of bid and security required for the submission (sealed envelope, name of bidder and name of project, etc.)
- Instructions concerning unit prices, and alternative prices.
- Criteria for the selection of the successful bidder and award of contract (such as price, duration of construction, experience)



2.3 Management of the Project

2.3.10 Contract Administration — Office Functions

2.3.10

Canadian Handbook of Practice for Architects

Introduction

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Contract Administration — Office Functions

Introduction

An architect looks out for the client's interests during construction through the services known as "contract administration." These services require a qualified architect or contract administrator who has tact and knowledge about construction. Many architects specialize in this field. Clients do not always value the professional services provided for contract administration, and sometimes try to reduce or eliminate the role of the architect during this phase. However, many jurisdictions now require professional involvement in the construction phase of most building types.

This chapter focuses on **office functions** under contract administration. It is important to understand that "office functions" support "field functions" undertaken during construction. Refer to Chapter 2.3.11, *Contract Administration — Field Functions*.

At the start of construction, in a traditional design-bid-build contract, a new participant — the contractor — is introduced to the project and takes on the responsibility and control of the construction. It is the contractor who assumes responsibility and control of the construction. The architect also takes on new responsibilities as described in the construction contract. These responsibilities support both the client and the contractor's interests in the successful completion of the construction phase.

With other forms of project delivery the architect's relationship with the contractor may vary. This chapter is written with the assumption that the architect is administering a stipulated sum contract for a project under a project delivery system using Design-Bid-Build and the architect is the prime or managing consultant for the building project.

Purpose of Contract Administration

Contract administration describes the services provided by the architect to fulfill the roles in standard construction contracts such as those duties outlined in General Condition GC 2.2 of CCDC 2, *Role of the Consultant*. The construction contract also describes their respective roles and obligations of the contractor and the owner. In addition, contract administration provides an opportunity for the architect to assist in realizing the project by providing the contractor with technical interpretations and information.

The resources, money, time, and effort invested in the development of the project, as well as the value of the completed work, require that the contractor's performance be monitored throughout the construction period.

The nature of the project, the type of construction contract, and the method of contract award as well as the architect's agreed-to services and fees all have a direct bearing on the level and nature of the monitoring that will be required. For example:

- an open and public tender, or a more technically sophisticated project in a fixed-price contract, will require more monitoring;
- a simple project, or a project under a cost-plus type contract awarded to one of a pre-selected list of contractors, may require much less supervision;
- a tight construction schedule will require more monitoring than one with fewer time constraints.

The nature and scope of the architect's services during the construction phase are defined by both the construction contract (such as CCDC 2) and the client-architect agreement (such as *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six*).

Role of the Architect

The nature and scope of the architect's services during the contract administration phase are outlined in the client-architect agreement. Furthermore, the architect's role is described in many construction contracts. For example, Part 2 of CCDC 2, "Administration of the Contract" clearly outlines:

- the authority of the "Consultant";
- the role of the "Consultant";
- the "Consultant's" role in correcting "defective work."

In addition, if the consultant is unable to resolve differences between the owner and the contractor regarding "the interpretation, application or administration of the contract," the consultant is obligated under "Dispute Resolution" (Part 8, CCDC 2) to provide instructions to prevent delays in the event of a dispute.

The architect's specific office functions include:

- representing and providing advice to the client;
- review of the construction schedule and contractor's schedule of values;
- preparing all documentation for the contractor and the client and others, including:
  - Supplemental Instructions;
  - Field Review Reports (refer to Chapter 2.3.11, *Contract Administration — Field Functions*);
  - Change Orders;
  - Change Directives;
  - summary of Change Orders;
  - certificates;
- coordinating the services of consultants;
- evaluating contractor's proposed substitutions and progress claims;
- reviewing shop drawings;
- reviewing operating and maintenance manuals at project close-out;
- rendering interpretations;
- follow-up with warranty items during the warranty period.

Sometimes, the architect may be responsible for recording minutes of site meetings.

Role of Others

Client
The client or owner is the entity which has entered into a contract with the contractor. The client's basic responsibilities are:

- providing financing information if required;
- making payments to the contractor;
- authorizing changes in the work;
- providing prompt decisions and directions.

Consultants
These may be sub-consultants engaged by the prime or managing consultant, that is, the architect, or they may be professionals engaged directly by the client through separate contracts. The prime or managing consultant's role includes the **coordination** of consultants.

Consultants assist the architect in office functions by:

- reviewing relevant shop drawings;
- interpreting their part of the contract documents;
- issuing supplemental instructions on their part of the contract documents;
- assisting in the preparation of Change Orders when required;
- reviewing their portion of the work to determine the percentage complete (which assists the architect in the preparation of Certificates for Payment);
- providing advice to assist the architect in the preparation of other certificates.

Contractor
As a party to the contract with the owner, the contractor is responsible for the execution of all the work, means, and procedures required to carry out the construction work as described in the contract documents.

Specifically, the contractor:

- studies the contract documents and fulfils all requirements including regulatory requirements to the extent provided for in the contract documents;
- supervises and coordinates the work of all trades and sub-contractors;
- executes the work by selecting all construction methods, techniques, sequences, etc.;

- is usually responsible for construction safety and all workplace regulations;
- pays for all labour, products, and sub-contracts.

Refer also to Chapter 1.2.1, *The Construction Industry*.

Office Functions

Office functions for the contract administration phase of a building include managerial work undertaken at the following stages:

- prior to construction;
- during construction;
- at close-out;
- during the warranty period.

Prior to Construction

Before the beginning of the construction phase, the architect carries out the following tasks:

- assists in the preparation of the contract form in duplicate for signing by the owner and the contractor;
- assembles the required number of sets of contract documents (refer also to Chapter 2.3.9, *Construction Procurement,* for details on the preparation of the contract);
- assembles and issues sets of drawings and specifications required by the contractor for the work;
- issues (in some cases) a set of updated documents showing all changes and revisions made during the bidding period to ensure that:
  - there is no confusion over the appropriate document;
  - no obsolete document remains in circulation.

The architect checks the contract documents, in particular, the General Conditions and the Supplementary General Conditions, for all required documents and information to be submitted by the contractor at commencement of work. These may include:

- performance bond;
- labour and material payment bond;
- insurance certificates;
- construction schedule;
- schedule of values for the parts of the work (which forms the basis for applications for progress payments).

Prior to mobilization, the architect should also obtain the following information from the contractor:

- complete list of sub-contractors and suppliers;
- statement of qualifications of contractor's site superintendent;
- proof of current standing of contractor (and sub-contractors) with the respective provincial or territorial health and safety agencies;
- required approvals from Authorities Having Jurisdiction for start-up;
- job-site accident prevention program;
- hazardous materials assessment (where applicable);
- list of personnel with authorized access to the construction site.

After a specified number of days following the award of the contract, the architect sometimes requires:

- a schedule of dates for submission and review of shop drawings;
- a site organization and hoarding plan;
- designs for temporary supports (such as shoring and underpinning, etc.);
- construction waste management plan;
- proof of the contractor's application for special permits and authorizations from Authorities Having Jurisdiction, public utility companies, etc.

[Note: the General Conditions of the construction contract require the owner to obtain and pay for the building permit. Frequently, the architect may apply for the building permit on behalf of the owner as soon as documents are issued for bidding, to avoid delay in the start of construction.]

Construction Schedule
Usually, the contractor is required to submit a construction schedule.

Construction schedules:

- set out the timetable for the construction work;
- indicate the contractor's intended construction methods and sequence;
- reveal the contractor's ability to successfully manage the work to meet the owner's

intended date of occupancy;
- identify owner-supplied equipment and coordination required for other separate contracts;
- expose shortcomings in planning and organizing.

The construction schedule should be carefully reviewed.

Scheduling methods vary from simple bar charts to complex critical path diagrams. The architect should become familiar with various methods, and select and specify the most appropriate method for the project.

Refer to the Appendix in Chapter 2.3.2, *Types of Construction Project Delivery,* for various types of construction scheduling.

During Construction

The standard stipulated-sum construction contract, (such as CCDC 2) and the client-architect agreement (such as RAIC Document Six) require the architect to:

- review shop drawings, samples, and product data submittals;
- provide timely interpretation of the contract by responding to Requests for Information and issuing *Supplemental Instructions*;
- prepare and issue *Proposed Change* forms in a timely manner;
- review the contractor's quotations prepared in response to:
  - *Proposed Changes;*
  - claims for additional costs initiated by the contractor;
- prepare and issue:
  - *Change Directives* if the adjustments to the contract price and time have not yet been agreed upon;
  - *Change Orders* once the adjustments to the contract price and time have been agreed to;
- review progress payment requests, usually on a monthly basis, in order to:
  - monitor progress of construction against the contractor's schedule;
  - compare the contractor's schedule of values with the actual work performed;
  - verify receipt of *Statutory Declarations and Certificates* from the respective provincial or territorial health and safety agencies such as the Workplace Safety and Insurance Board or Workers Compensation Board for the second and subsequent submissions;
  - prepare a *Certificate for Payment* and necessary documentation for progressive release of holdbacks and forward to the owner;
- provide support to field functions (refer to Chapter 2.3.11, *Contract Administration — Field Functions*):
  - prepare and distribute field review reports;
  - prepare agenda for special site meetings.

At Close-out

At the end of construction, the contract documents generally require the contractor to submit the following for review by the architect:
- municipal *Occupancy Permit;*
- an annotated set of record drawings and specifications showing all changes made during construction;
- manuals, incorporating the following data:
  - maintenance and operating instructions;
  - all warranties for materials, equipment, and products;
  - copies of all the permits and certificates of authorization issued by the various public utilities companies and Authorities Having Jurisdiction;
- final *Clearance Certificate* from the respective provincial or territorial health and safety agencies;
- *Statutory Declarations* for application for release of holdback from the general contractor and all sub-contractors;
- final reports on work carried out to correct deficiencies;
- a list of all contractors and trade subcontractors;
- replacement materials, maintenance products, special tools, etc.

The architect reviews the documents and submits them to the owner with comments or recommendations regarding their conformity with the contract requirements.

Refer to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations*, for tasks to be undertaken after the construction is substantially complete.

Shop Drawings, Samples, and Mock-ups

Shop Drawings

Shop drawings ensure and confirm the accuracy, size, and other specific data about a product or material prior to final purchase, fabrication or delivery. Shop drawings are prepared to indicate:

- accurate dimensions, size, quantity, and location;
- precise fabrication methods;
- construction and/or field erection techniques;
- information to coordinate related trades or adjacent work;
- elaboration on diagrammatic information;
- confirmation of the selection of options, such as colour or finish.

At the initial pre-construction meeting with the contractor, the architect usually establishes the standard procedures for submittal and review of shop drawings, samples, and mock-ups. Before submitting shop drawings to the architect for review, the contractor is responsible for verifying:

- quantities;
- dimensions;
- accuracy;
- completeness;
- compliance with the specifications.

The submission requirements and the format for shop drawings should be contained in the specifications. Certain shop drawings must be reviewed by the consultants. Shop drawings do not supersede the contract documents but **supplement** them to assist in the construction.

The review of shop drawings carries certain liabilities for the architect. The architect must take care to review only those portions of the shop drawings which relate to the architectural design. The consultants and engineers are responsible for reviewing their part of the design. The precise wording of the cover letter and application of notations to shop drawings is important.

Refer to Chapter 2.4, *Sample Forms for the Management of the Project*, for suggested use and wording of shop drawing cover letters and notations stamps.

It is also important to ensure the timely review and tracking of all shop drawings.

Refer to Chapter 2.4, *Sample Forms for the Management of the Project*, for the use of a "Log of Shop Drawings and Samples."

Samples

Samples provide the architect with an opportunity to review and finalize selection of patterns and other specified, colours, textures, etc., and to confirm specific design and aesthetic intentions prior to ordering a product. The architect may wish to be pro-active and request early submissions of all samples to avoid any impact on the price or delivery of the finish or material.

Mock-ups

Refer to Chapter 2.3.11, *Contract Administration — Field Functions*, for a discussion of mock-ups.

Documentation

The architect develops accurate and thorough documentation during the construction phase of the project. This documentation assists in providing:

- record of communication with all parties;
- a project history;
- documentation in the event of a claim.

Typical types of documentation include:

- formal correspondence and emails;
- minutes of meetings;
- Supplemental Instructions;
- Change Orders;
- Certificates for Payment;
- other certificates:
  - Certificate of Substantial Performance;
  - Letters of Assurance;
  - Statements of Completion.

Many of these standard forms for contract administration are available in CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*.

Minutes or Records of Meetings

The architect usually attends many meetings throughout the course of a project, and it is important that key decisions be recorded.

Minutes should be reviewed for accuracy and completeness and, minutes together with any amendments, should be distributed to all parties.

Refer to Chapter 2.3.11, *Contract Administration — Field Functions*, for a discussion of site meetings and for "Checklist: Suggested Agenda for the Pre-construction Meeting."

Refer to Chapter 2.4, *Sample Forms for the Management of the Project*, for a form and example of "Minutes of Meeting."

Requests for Information

A Request for Information (RFI) is useful throughout the design and construction of a building project as a tool for the owner, architect, contractor or other party to request information from each other that cannot readily be obtained through research, document review, or other reasonable means. During the construction phase of a project, the general contractor, who is unable to find the information through review of the contract documents, often seeks information from the architect or the architect's consultants. The RFI is a procedure for the contractor to request clarifications when the intent of the contract documents is:

- unclear,
- incorrect, or,
- information is missing.

For more information on Requests for Information and some possible pitfalls in using RFIs, refer to Appendix A – Requests for Information at the end of this chapter. For a sample form refer to Chapter 2.4, *Sample Forms for the Management of the Project* under Section 3, Forms for Contract Administration.

Supplemental Instructions

The architect (sometimes with the assistance of consultants) issues Supplemental Instructions to **clarify** or **interpret** the contract documents. Supplemental Instructions can also be issued to provide direction to the contractor concerning a problem which may have resulted during the course of construction.

If the Supplemental Instruction involves changes to the contract price or to the contract time, the architect should issue a Change Order or Change Directive.

Refer to CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*, for the information to be contained in a Supplemental Instruction and for a sample form.

Change Orders

Change Orders cover adjustments to the scope of work that require a change changes to the **contract price** or **contract time**. Sometimes the process for making changes can be demanding and time-consuming. Change Orders are required for the following reasons:

- additional requirements or changes in the requirements made by the client/owner;
- new or different interpretation of requirements by Authorities Having Jurisdiction;
- work not described in the contract documents;
- work inaccurately or incorrectly described in the contract documents;
- substitutions which may affect the contract time or contract price.

Proposed Change
The process is usually started by the issuance of a form known by one of the following terms:

- Proposed Change;
- Notice Of Change;
- Contemplated Change Order; or
- Change Notice.

CCDC recommends the term "**Proposed Change**." The purpose of this form is to alert the contractor to the proposed change and to provide the contractor an opportunity to submit a quotation for additional cost (or credit) or a change in time (if any) for the proposed change.

Change Directive
If the contractor's price cannot quickly be agreed to, the architect may issue a Change Directive if the proposed changes are within the general scope of work described in the contract documents. A Change Directive avoids delays and permits work to proceed while negotiations continue over the price of the proposed change.

Change Order
The Change Order is the final form which indicates the agreement between the client/owner and the contractor on specific additions, deletions or revisions to the contract documents.

Summary of Changes
Tracking and tabulating all Change Orders is important for two reasons: to establish the revised contract price (and time), and to process Certificates for Payment. Typically, all Change Orders are listed on a table or chart identifying all credits, extras, and the adjusted contract price.

Refer to CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*, for the information to be contained in a "Proposed Change," a "Change Order," and a "Summary of Changes," and for sample forms.

Certificates for Payment

In typical stipulated-sum construction contracts, the architect is responsible for preparing Certificates for Payment indicating when and how much a client must pay the contractor. Certificates for Payment are based on:

- the schedule of values agreed to and prepared at the start of construction;
- the architect's determination of the percentage of work completed, based on a field review;
- the applicable holdbacks required in the provincial or territorial lien legislation.

Schedule of Values
Usually the contractor submits a schedule of values at the start of the project. The schedule of values is typically sub-divided by divisions, major sub-trades or quantifiable elements related to the construction. The work performed by the general contractor's own forces — as well as the costs for mobilization, supervision, overhead, and profit — are usually indicated. The value of sub-trade contracts and sub-trade breakdowns assists in determining the appropriate Certificates for Payment and the progressive release of holdback monies for lien purposes.

The architect should review the schedule of values for completeness and for an accurate and realistic distribution of cost. It can be compared with the most recent construction cost estimate to identify significant discrepancies.

Percentage of Work Complete
Payments to a general contractor under a construction contract are usually made on a monthly basis in response to the contractor's submission of a "progress claim." The architect should conduct a field review to determine if the percentage of work completed corresponds with the contractor's progress claim. Any discrepancies should be discussed with the contractor in order to provide an opportunity to make changes to the progress claim or to identify work which the architect may have overlooked. Assistance in determining the percentage completed of certain structural, mechanical, and electrical components will require a field review and advice from the engineering consultants. Once the architect has determined a representative percentage, a Certificate for Payment can be prepared.

Statutory Holdbacks
The architect prepares a Certificate for Payment based on the percentage of work complete and the contractor's progress claim. Change Orders must be accounted for in the Certificate for Payment as well as the appropriate holdback required by the provincial oe territorial lien legislation.

Refer to Chapter 2.3.12, *Take-over Procedures, Commissioning and Post-occupancy Evaluations*, for a list of the appropriate provincial lien acts to determine the amount of holdback and requirements for release of holdback monies.

Refer to CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*, for the information to be contained in a "Certificate for Payment" and a "Schedule of Values" and for sample forms.

Other Certificates

The architect may be required to prepare other documentation attesting to the status of the construction contract and the actual performance of the work. Two common forms of certificates are listed below. Moreover, it is common for the architect to provide a variety of documentation to Authorities Having Jurisdiction attesting to the general conformity of the building to applicable codes and other regulations.

Certificate of Substantial Performance
In most provinces, the date of substantial performance of the construction contract must be documented. This certificate sets a date which triggers the beginning of the warranty period (as outlined in CCDC 2) and the release of holdback monies (lien funds) which have been

established to provide some financial protection to sub-contractors.

The architect must understand the lien legislation in the province or territory where the project is located and prepare a Certificate of Substantial Performance based on this legislation.

Refer to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations* for a list of the appropriate provincial or territorial lien acts to determine the amount of holdback and requirements for the release of holdback monies.

Letters of Assurance

A Letter of Assurance is required by a few provinces including of British Columbia, Alberta and Nova Scotia. All architects practicing in this province should refer to their provincial legislation and regulations and check with their associations for advice on the application of these certificates.

Letters of Assurance must be signed, sealed, and dated by registered architects who are practising (principals) in architectural firms or who hold Certificates of Practice in designated engineering firms. The purpose of a Letter of Assurance is to provide certification to Authorities Having Jurisdiction.

The standard forms of Letters of Assurance must always be used as provided in the British Columbia Building Code (or the Vancouver Building Bylaw's counterpart forms).

In British Columbia, the British Columbia Building Code standard forms of Letters of Assurance (or the Vancouver Building Bylaw's counterpart forms) must always be used.

Definitions

Certificate: A document attesting to the truth of a fact; in construction, a certificate is prepared by a professional, either an architect or an engineer.

Certificate of Substantial Performance: A certificate issued under the appropriate lien legislation attesting that the contract between the owner and the contractor is substantially complete.

Contract Administration: The services provided by an architect during the construction phase of a project. For stipulated construction price contracts, these services are outlined in detail in in one of the Schedules of Architect's Services which accompany the *Canadian Standard Form of Agreement Between Client and Architect: RAIC Document Six*.

Holdback: A percentage of the monetary amount payable under a (construction) contract, which is held as security for a certain period of time. The percentage and period of time are based on the provincial lien legislation.

Lien: A legal claim on real property to satisfy a debt owed to the lien claimant by the property owner. This claim can carry the right to sell the property upon default.

Shop Drawing: A drawing, diagram, schedule or data prepared on behalf of the contractor to indicate precise details of the construction materials, products or installation. Usually prepared by the "shop" or trade or manufacturer, supplier or fabricator responsible for the particular product.

References

Canadian Construction Documents Committee (CCDC). Ottawa, Ont.
CCDC 2, *Stipulated Price Contract*.

CCDC 24, *A Guide to Model Forms and Support Documents*.

Demkin, Joseph A., executive editor. *The Architect's Handbook of Professional Practice*. The American Institute of Architects. Hoboken, New Jersey: John Wiley & Sons, Inc. 2008.

Mays, Patrick C. and B.J. Novitski. *Construction Administration: An Architect's Guide to Surviving Information Overload*. Toronto, Ont.: John Wiley & Sons, 1997.

O'Brien, James J. *Construction Change Orders: Impact, Avoidance, and Documentation*. New York, NY: McGraw-Hill, 1998.

O'Leary, Arthur. *A Guide to Successful Construction: Effective Contract Administration*. Los Angeles, CA: Building News Inc., 1996.

The Royal Architectural Institute of Canada.
Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six
www.raic.org/practice/contract_documents/document6_e.htm

Appendix A - Requests for Information

A Request for Information (RFI) is useful throughout the design and construction of a building project as a tool for the owner, architect, contractor or other party to request information from each other that cannot readily be obtained through research, document review, or other reasonable means.

This Appendix focuses on the uses of a RFI during the construction phase of a project, when the general contractor is usually seeking information from the architect or the architect's consultants and is unable to find the information through review of the contract documents. The RFI is a procedure for the contractor to request clarifications when the intent of the contract documents is:

- unclear,
- incorrect,
- or, information is missing.

RFIs can contribute significantly to the smooth progress of construction, particularly when they are submitted well in advance, giving the architect and consultants time to clarify or correct a potential problem before it becomes a matter that could delay the progress of the work.

A new form has been developed for this purpose, Request for Information, based on AIA Document G716 – 2004, and a sample is included in Chapter 2.4, Standard Forms for the Management of the Project under Section 3, Forms for Contract Administration.

In all cases, it is the responsibility of the architect to provide the information or answer, with input from consultants when appropriate, either by issuing a Supplemental Instruction if there is no change to the Contract Price or Contract Time or, if changes are necessary, by initiating a Proposed Change, followed by either a Change Directive or a Change Order.

Some general contractors abuse the RFI process by issuing an excessive number of unnecessary or "frivolous" RFIs. There are several possible reasons for this:

- to ask the architect is easier than taking the time to find information readily available within the contract documents;
- to attempt to transfer to the architect the contractor's responsibility for acts or omissions (refer to the General Conditions, GC1.3.2 and GC1.3.3 of RAIC Document 6, 2002);
- to imply non-existent errors or omissions in the documents to support claims for additional work;
- to set up circumstances to support subsequent unjustified delay claims; or
- to discredit the architect's competence while, at the same time, promoting the contractor's mastery of the construction process.

The prudent architect ensures that the client/architect agreement includes provisions for appropriate compensation by the client for additional work related to:

- changes to the Contract Price or Contract Time resulting from RFIs, or
- changes in scope initiated by the client.

Whatever the reason for the request, the architect is obliged to respond to every RFI, however frivolous, unjustified or unnecessary. As a result, the architect must commit a significant amount of time and effort in answering unnecessary RFIs, for which there is no established means of being compensated. It is not reasonable that the architect should have to absorb the related costs if a general contractor consistently abuses the RFI process, but it would also not be reasonable to expect the client to bear costs resulting from such unacceptable behaviour by the contractor.

In order to ensure that the architect will be reimbursed for the expense of responding to unnecessary RFIs issued by the general contractor, consideration should be given to adding the following Supplementary Condition to the CCDC 2 General Conditions, revising GC 5.8 Withholding of Payment to state:

- the architect may determine that certain RFIs issued by the contractor are unnecessary and shall, in responding to such unnecessary RFIs, give the reasons for the determination in each case;
- if the contractor continues to issue unnecessary RFIs, the architect, after having identified a minimum of five [for example] RFIs as unnecessary, will invoice the client for the additional administrative cost of responding to each of the subsequent unnecessary RFIs;
- the architect will notify the contractor and client each time such an additional administrative cost is charged;
- the client shall reimburse the architect for the monthly total of such additional administrative costs; and
- the monthly total of such additional administrative costs shall be charged to the general contractor by showing the monthly total as a credit on each subsequent Certificate for Payment. This constitutes a change to the contract price and must be handled as a Change Order.

In addition, the AIA Document G716 – 2004 Instructions, which accompanies the standard AIA form Request for Information ("RFI"), Document G716 – 2004, states under "Purpose":

> *"...The RFI is utilized to obtain information that the requesting party cannot obtain through research, document review, or other reasonable means. A RFI that is already contained or provided for in the contract documents may result in additional administrative charges ..."*

Appendix B – Processing Change Orders

Issuing **Change Orders** is the final step in the process of confirming and recording **changes in contract price** and/or **changes in contract time** for a construction contract. Refer also to page 6, *Chapter 2.3.10, Contract Administration – Office Functions* and to *CCDC 24 – a Guide to Model Forms and Support Documents*.

As soon as possible after realizing the need for a change, the architect should determine the cause or reason for the change, and then inform the client and all relevant consultants that the proposed change may result in a change to the:

- scope of services;
- project schedule; or
- professional fees.

Work by the architect or consultants on the preparation of the change documents should not proceed without written authorization from the client or owner.

The Ontario Association of Architects has developed a new **Agreed Change Form** for this purpose (OAA Practice Bulletin B.16, *Consulting Contracts, Managing Contractual Change* includes the background and recommended procedure for the use of this form).

Proposed Changes

When the need for a change occurs, the architect (and/or the appropriate consultant) prepares and issues to the contractor written and graphic documents, as necessary, to describe the proposed change or a notice of a change being contemplated. Although CCDC recommends the term "Proposed Change" many architects use the term "Contemplated Change".

Sometimes a contractor will claim that a clarification or interpretation in a Supplemental Instruction is a change. If a Supplemental Instruction identifies work that is deemed to be a change in price and/or time, the architect should obtain a quotation for the changes from the contractor. If the contractor's quotation is accepted, a Proposed Change is issued, assigned the next consecutive Proposed Change number, and entered on the Summary of Changes Form.

As documents are prepared, the architect must forward copies to the owner, contractor and relevant consultants with any necessary covering letters of explanation.

Change Directives and Change Orders

Once a quotation has been received, reviewed by the architect, and/or referred to the appropriate consultant for review, the architect then prepares documents for approval from the owner, and then instructs the contractor to proceed with the change, using either a **Change Directive** or **Change Order**.

A ***Change Directive*** is used when further time is required to finalize or negotiate the changes to the contract price and contract time, but work on the project cannot be delayed. The Change Directive authorizes the change in the work to proceed and indicates that the adjustment to contract price and contract time will be finalized later by Change Order. *A Change Directive may be issued to the contractor without a preceding Proposed Change when, for example, it is urgent that a change be authorized to proceed immediately* ***without*** *waiting for a quotation from the contractor. In these circumstances, the Change Directive is the initial document and therefore must include the detailed statement of the work required which is normally provided in a Proposed Change.*

A ***Change Order*** is used to authorize the change and adjust the contract price and contract time when the contractor's quotation is acceptable, or to confirm charges or adjustments to contingency or cash allowances in the contract.

The architect prepares the document (frequently an electronic form) and forwards it to the owner for signature. The owner returns an electronic copy with electronic signature to the architect, who forwards the copy to the contractor for signature. Copies of all signed documents, confirming acceptance and approval, are forwarded to all parties including relevant consultants.

Summary of Changes

When a Proposed Change is initiated, it should be entered immediately on a Summary of Changes Form, used to track the status of all changes. This document is an important tool for the architect to manage a process which can become chaotic if it is not closely monitored.

The sample Summary of Changes Form in CCDC 24 is adequate for many projects. However, for larger or more complex projects, an expanded Summary of Changes in spreadsheet format is recommended, with headings for recording dates for every step in the process. A sample of this form is included in *Chapter 2.4, Standard Forms for the Management of the Project*. The form should include the following information:

- ***Proposed Change or Change Directive:***
  - number (as below)
  - brief description of content;
  - action columns, noting dates of:
    - issue;
    - receipt of quotation;
    - transmission to consultant for review, noting name or discipline and deadline for response;
    - receipt of comments from consultant;
    - return of an unacceptable quotation to contractor with a request for revision, noting deadline for their response.

  (Note: Record additional iterations of receive/review/return, which may occur with complex changes, in same columns, noted rev.1, rev. 2, as needed)

- ***Change Order:***
  - number (as above);
  - date of issue;
  - change in contract price (extra or credit) and, if charged to allowance, identifying which;
  - change in contract time.

- ***Remarks*** (for example, identifying a Supplemental Instruction that becomes a Proposed Change).

Numbering and Cross-Referencing Documents

There are two methods typically used by architects for assigning numbers and recording changes. The architect should use the selected method consistently.

1. The first method involves assigning consecutive numbers to each document in the change process as they are prepared, *using a separate numbering sequence for each document type* (separate numbering for Supplemental Instruction, Proposed Change, Change Directive and Change Order) and entering the number on the Summary of Changes Form. Since the timing of the change process is unpredictable, some architects believe it is not practical to attempt to retain the same number for each of the successive documents dealing with a specific change. Instead, referencing the number(s) of the preceding document(s) is done to assist in tracking the change process. For example, the first line of Change Directive 10 could be *Refer to Proposed Change 6*; then when the changes in contract price and time have been agreed, Change Order 14 begins *Refer to Proposed Change 6 & Change Directive 10*. Often grouping Proposed Changes to form a single Change Order makes sense in balancing credits and extras, and this may be better received. Approved change orders are consecutively numbered to avoid gaps when a proposed change does not proceed beyond pricing.

2. Many architects and large clients prefer to create a separate file and number for each document type in the change process and *to keep the same number assigned to the change throughout the approval process*. It is simple and easy to track each change with its own unique number and this avoids incorporating several Proposed Changes under one Change Order (for example, Proposed Change No. 8 automatically becomes Change Order No. 8). If a proposed change is abandoned it is simply recorded as cancelled and the number remains. This makes tracking of the process easy. Again, the Summary of Changes Form should be completed immediately recording all changes.

Recording Change Orders on Certificates for Payment

Each monthly Certificate for Payment states the current value of the contract in the section headed, "Contract Summary", by adding the net total price of all changes agreed to up to the date of the Certificate for Payment, including:

- Change Orders issued; plus
- the current value of work under Change Directives certified.

The "Contract Summary" section in the model Certificate for Payment Form in CCDC 24 proposes showing the net total price, only, of all Change Orders issued previously, including the current month; there is no space for providing details of the change in price for each of the current changes. The Guideline to the Certificate for Payment Form in CCDC 24 advises, however, that the method of presenting this information should be revised as necessary to suit the many variations in accounting used for this process.

Architects *may* prefer to present more detail on the Certificate for Payment, rather than preparing a separate detailed summary each month for attachment to the Certificate. For example, a summary of the status of Change Orders would list, on separate lines in the Contract Summary section on the Certificate itself:

- the **total** price of changes issued previously;
- changes issued during the preceding month, each listed separately, showing:
  - the Change Order number; and
  - the increase or decrease in the contract price;

The **net total** of the current month's issued Change Orders is shown in the totals column.

Construction contracts frequently include a Contingency Allowance, against which the price of each Change Order is charged or credited. The Guide to the CCDC 24 Certificate for Payment Form contains an example showing a method for reporting these charges when this type of contract is used.

Adjustments to all Allowances are made at the end of the work to determine a final Contract Price by issuing Change Orders that credit the unspent balance remaining in the Allowances or add any over-run.

References

Canadian Construction Documents Committee (CCDC). Ottawa, ON
CCDC 24, A Guide to Model Forms and Support Documents (for use with CCDC 2 – 1994). 1996

Ontario Association of Architects (OAA). Toronto, ON
Practice Bulletin Number B.8h, Ontario Joint Standard Practice Committee (OJSPC) Agreed Item 8, Change Procedures. July, 1998

Practice Bulletin Number B.16, Consulting Contracts, Managing Contractual Change. October 2004
Agreed Change Form [includes new standard form for use by architect]

Practice Bulletin Number C.5, Certificate for Payment. October 2004
Certificate for Payment [filled in as sample]

Checklist: Typical Items for Shop Drawing Review

This list is NOT all-inclusive, but it does suggest certain typical elements which may require shop drawings. The list also indicates some parts and features of the shop drawings which may require review by the architect and the engineers. The list is extensive and not typical for most projects. [Note: this list also includes some samples and mock-ups.]

Product or System	Items to review	Review by:
Division 01. General		
Building Layout (surveyor's drawing)	- general layout - dimensions	Architect
Construction Sign and Hoarding Drawings	- design - colour - construction - location - dimensions - capacity of sign to withstand lateral forces from wind loads	Architect Structural Engineer
Scaffolding	- general layout and location - design and connections	Architect Structural Engineer
Division 31. and 32. Site Work		
Excavation: (shoring, bracing, and sheet piling)	- location - design, including calculations - construction - dimensions - levels	Architect and Structural Engineer Structural Engineer
Piling: (caissons and piles)	- locations - dimensions and sizes - reinforcing - welding - design - transition caps - concrete strength - elevations and levels - as-built drawings	Structural Engineer
Site Furnishings	- colour - finish - layout and dimensions	Architect
Pre-cast Curbs	- dimensions and sizes - shape - holes for ground rods - locations and quantity - finish - weep holes	Architect
Pre-cast Unit Pavers	- dimensions and sizes - shape - finish - joint details and location - extent of unit pavers - materials - base and/or support	Architect

Product or System	Items to review	Review by:
Division 03. Concrete		
Cast-in-Place Concrete	- reinforcing (size, location, quality) - location of elements - concrete strength - dimensions of elements - opening sizes - spans - footing levels - stepped footing	Structural Engineer
	- construction joints - expansion joints - slab depressions - recesses - form tie pattern and spacing - dimensions - size and location of openings - waterproofing recesses and joints - stepped walls - weep holes - mechanical and electrical services locations	Architect
Pre-cast Concrete	- reinforcing (size, location, quantity) - connection and bearing details and location - concrete strength - provisions for lifting	Structural Engineer
	- materials - dimensions and sizes - shape - location - finish and colour (sample) - drips - reglets - joint details - anchor bolts and/or inserts for other materials - waterproofing - openings - mechanical and electrical services locations	Architect
Division 04. Masonry		
Masonry Walls (mock-ups sometimes required)	- masonry units - mortar colour and texture - joint tooling technique - joint size - coursing - masonry ties	Architect

Product or System	Items to review	Review by:
Division 05. Metals		
Structural Steel	- grades of steel - anchor bolt plan layout and dimensions - dimensions and sizes of members - specific deviations from grid lines - heights and levels of beams - connection details - base plate details - anchors required for other materials - size and location of openings through members - bearing details - expansion joint details - painting - framing around openings - lintels - provision for future additions - fireproofing (sample)	Structural Engineer
	- dimensions - method of fireproofing (sample) and/or rated assembly - finish (sample)	Architect
Steel Joists	- engineering certificate - sizes - spacing and location - bearing details - bracing and/or bridging locations - bottom chord extensions	Structural Engineer
	- mechanical services locations - finish	Architect
Metal Decking	- type - gauge of metal - finish - fastenings - location of openings and framing - location and details of closure plates - loads	Structural Engineer
Metal Fabrications, Miscellaneous Metals, Metal Stairs and Railings, Ornamental Metal	- location - dimensions and sizes - finish - hangers and fastening details - construction and installation - material - railing expansion joints - compliance with codes with respect to resistance to horizontal and vertical loads	Architect
Load-bearing Metal Stud Framing	- gauge and galvanic finish - spacing - connection details	Structural Engineer

Product or System	Items to review	Review by:
Division 06. Wood and Plastics		
Timber Framing and Prefabricated Structural Wood	- engineering certificate - sizes - spacing and location - bearing details - bracing and/or bridging locations - connections	Structural Engineer
	- finish - exposed connection design - mechanical services locations	Architect
Architectural Woodwork and Millwork	- design - dimensions and sizes - location - material (species, grain direction, and pattern) - finish (sample) - mechanical and electrical services locations - construction and installation - hardware and location - interference between hardware and door or drawer operation - plastic laminate (sample)	Architect
Division 07. Thermal and Moisture Protection		
Metal Cladding	- profile - material construction - finish and colour - dimensions and sizes - openings - installation details - fixing details to structure - cladding support system - weatherproofing (flashing, sealing, etc.)	Architect
Roof Insulation (tapered)	- thickness - locations of penetrations - slope	Architect
Exterior Insulation and Finish Systems	- insulation - colour (sample) - finish (sample) - expansion and control joints - decorative features - reinforcement details	Architect

Product or System	Items to review	Review by:
Division 08. Doors and Windows		
Doors and Frames	- material - construction - finish - location - dimensions and sizes - size of undercut - glass and louvre openings - finishing hardware locations - door swings - frame profiles - frame installation details - fire ratings - bumpers	Architect
Aluminum Doors, Frames, and Screens	- location - type - dimensions and sizes - frame profile - anchorages - location with respect to wall thickness - transom panel - finishing hardware location - door swings - construction - grilles - finish - gauge of material - bumpers - reinforcing for hardware - astragal - rebate sizes - stop location and size - door head frame wide enough for specified hardware - glazing - fire ratings	Architect
Windows	- profile - sizes - material - finish - location in relation to wall thickness - sealant at perimeter of frame - anchorages - tolerances for structural movement, especially at head - material thickness - insect screen - opening and locking mechanism - weeping holes - glazing (type) - weather bars if specified - sill detail - fixed and operable window section	Architect
Hardware (schedules)	- type - finish - location - function - fire rating - keying system - electrical requirements	Architect Electrical Engineer

Product or System	Items to review	Review by:
Division 09. Finishes		
Generally, shop drawings are not supplied, unless required, except for special treatment such as travertine walls, marble floors, etc., where joint lines and grain direction are important. All finishes are normally approved on the basis of material **samples** submitted to the architect for reviewing against the specifications and colour schedule.		
Special Finishes or Treatment	- material - finish - location - extent of application - joint type location, size, and detail - panel sizes - grain direction and pattern - base, ceiling, and corner details - fixing and location - location and size of openings	Architect
Carpeting and Resilient Flooring	- location - access to electrical underfloor duct system - installation and accessories - seam locations and pattern direction	Architect
Division 10. Specialties		
Manufactured Specialties	- finish and colour - location - fixing details - construction - dimensions and sizes - material - gauges - dimensions and sizes	Architect
Washroom Accessories	- type - finish and colour - fixings - construction - materials - gauges - dimensions and sizes	Architect
Toilet Partitions	- location - type - dimensions and sizes - material - finish and colour - reinforcing for accessories - door swing - hardware - construction - gauges	Architect
Signs and Directories	- location - dimensions and sizes - construction - finish and colour - material - fixings - electrical and mechanical services locations if applicable - access - glazing - lettering	Architect

Product or System	Items to review	Review by:
Division 11. Equipment		
Special Equipment (e.g., kitchen equipment, computers, controls, machinery, lifts, etc.)	- location - clearances required around equipment for maintenance - access for replacement	Architect
	- loading and vibration - dimensions and sizes - finish and colour - installation details (isolation — structure, sound, heat)	Structural Engineer
	- mechanical services, sizes, and location	Mechanical Engineer
	- electrical services, sizes, and location	Electrical Engineer
Division 12. Furnishings		
Blinds and Window Treatment	- type - finish and colour - fixings - dimensions and sizes - operation	Architect
Division 13. Special Construction		
Special Construction	- location - extent - material - dimensions and sizes - construction - finish and colour - installation - clearances - presence of electrical services - presence of mechanical services	Architect

Product or System	Items to review	Review by:
14. Conveying Systems		
Elevators, Lifts, and Dumbwaiters	- shaft construction - shaft sizes - clearances and heights - door frame details and finishes - cab sizes - design and finish of cab - design, finish, and location of name plates, push buttons, hall indicators, etc. - equipment location - shaft projections - number of stops - operation (fire fighter's elevator)	Architect and Structural Engineer
	- imposed loads - sizes of structural members, hoist beams, etc. - bearing of load capacity members	Structural Engineer
	- shaft and machine room ventilation requirements	Mechanical Engineer
	- electrical services and equipment and location of same	Electrical Engineer
Escalators	- location - size of floor openings - escalator dimensions - material - finish and colour - access - installation details with respect to adjacent areas - clearances around escalators	Architect and Structural Engineer
	- imposed loads - sizes of structural members, hoist beams, etc. - bearing of load capacity members	Structural Engineer
	- electrical services and equipment and location of same	Electrical Engineer
Pneumatic Tube System	- tube runs and tube sizes - station location - station design - materials - finish and colour - operation and speed - construction - openings required in structure - exhaust and its location - station interconnections - accessories such as carriers, speed controllers - type of sending and receiving terminals - station access for maintenance	Architect
Conveyors	- shaft dimensions - shaft construction - conveyor routing - material - finish and colour - clearances - dimensions and sizes - access for maintenance - operation - number of stations and location	Architect

Product or System	Items to review	Review by:
Divisions 21., 22., 23. Mechanical		
Sprinkler Systems	- location and spacing - finish - special requirements	Architect and Mechanical Engineer
	- conformity with NFPA and insurance underwriter standards - pressure and flow - calculations based on correct data - design - equipment and pipe sizes - water storage tanks, pumps, valves - sprinkler control trees - clearances, access - supports, foundations	Mechanical Engineer
Plumbing Fixtures	- colour - controls - mounting and installation requirements	Architect and Mechancial Engineer
	- quantity - roughing-in requirements - connections	Mechanical Engineer
HVAC Units	- size and weight	Structural Engineer
	- location and required openings	Architect and Mechanical Engineer
	- all performance data	Mechanical Engineer
	- controls and electrical requirements	Electrical Engineer
Boiler Room Equipment (boilers, pumps, tanks)	- size and clearances - installation and mounting requirements - louvres and ventilation sizes	Architect. Structural and Mechanical Engineer
	- size and weight - location of openings - clearances, heights	Structural Engineer
	- all performance data	Mechanical Engineer
	- controls - power, panels, shut offs	Electrical Engineer
Diffusers	- colour - finish	Architect
	- louvre direction - other features (dampers, etc.)	Mechanical Engineer

Product or System	Items to review	Review by:
Divisions 25., 26.,27. Electrical		
Light Fixtures	- quantity - colour - finish - options - location - lamps	Architect
	- lamps - performance and installation	Electrical Engineer
Distribution Equipment	- location and size - clearances	Architect
	- all features	Electrical Engineer
Fire Alarm System, Security System, and Communications System	- location of components - size and colour	Architect
	- all features - quantity - rough-in requirements	Electrical Engineer



2.3 Management of the Project

2.3.11 Contract Administration — Field Functions

2.3.11

Canadian Handbook of Practice for Architects

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Contract Administration — Field Functions

Introduction

The field functions of contract administration are done concurrently and in coordination with a variety of office tasks. Refer to Chapter 2.3.10, *Construction Administration — Office Functions*, for a description of the office work that supports field functions.

The terms used to describe the functions performed by an architect during the construction — or contract administration — phase of a project, on site or out of the office, are:

- field review;
- general review;
- site review;
- site observations.

The terms *"supervision"* and *"inspection"* refer to completely different levels of service **not** normally provided by an architect.

- "Supervision" implies the overseeing of the construction work, including the activities undertaken by workers on site, which is the responsibility of the contractor, not the architect.
- "Inspection" means a "close examination" (of construction); once again, this level of service is beyond the architect's responsibilities.

The architect's duty during field review is to carry out sufficient periodic site visits at appropriate intervals during the various stages of construction to determine if the work is in general conformity with the contract documents. In addition, the architect reports on the progress of the work and observations made on site.

Purpose of Field Review

The architect's field review work has the following three purposes:

- to monitor the contractor's performance in maintaining both the construction schedule and the standards or quality of construction;
- to provide guidance to the contractor by interpreting the contract documents and issuing necessary Supplemental Instructions;
- to fulfil performance standards of general review as required by the client-architect agreement, Authorities Having Jurisdiction, and provincial or territorial associations of architects.

Site visits must be more than a brief stop at the construction site to speak with contractors, walk around, and take a few notes to forward to the client. Site visits are essential to the project's success; the architect must, therefore, assign a qualified senior or experienced staff member who is properly trained to perform field reviews. It may be useful to prepare a manual with proper procedures for field personnel.

All field functions should follow these principles:

- carefully describe, to the client, the architect's duties and role during the construction phase and adhere to these responsibilities;
- keep the client well-informed of the progress of the work, in part by sending copies of field review reports to the client and all appropriate parties;
- ensure that consultants review their portion of the work and submit field review reports;
- avoid the words "*inspect*" or "*supervise*" in all documentation;
- keep proper documentation including reports, logs, photographs, and videotapes;

- promote good communications with the contractor and building officials.

Role of the Architect

The architect's role in a project changes from designer to contract administrator once the construction of a project is underway. Refer to to the Schedules of Architect's Services which accompany the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six*, for a list of the architect's responsibilities during the construction phase of a project. The architect is both a representative of the client and an interpreter of the contract documents. Normally, the architect is present on site to:

- conduct a general or field review;
- attend site meetings;
- interpret contract documents or resolve problems;
- observe testing or other procedures;
- review and accept samples, mock-ups, etc.;
- meet with consultants, contractors or the client regarding the progress of the construction;
- determine the percentage of the work completed (information which is used to prepare certificates).

In most agreements, the architect is not required to make exhaustive inspections or continuous on-site review; nor is the architect responsible for the construction methods or procedures or for construction safety. However, the architect should understand workplace safety and practise "due diligence" on the construction site.

Role of Others During Construction

The architect communicates with many others who may visit the site during the construction phase of a project, including:

- the client or designated representative;
- the consultants or design team;
- the contractor, sub-contractors, and suppliers;
- Authorities Having Jurisdiction;
- inspection and testing firms;
- other institutions, such as lending institutions and insurance agents.

Client
The client's role varies depending on the client's expertise and interest in the construction phase of a project. Some clients will assign a representative dedicated to this phase or hire a clerk of the works to monitor and account for construction activities. On the other hand, some clients rely exclusively on the architect as their representative. The client or designated representative usually attends regular job-site meetings.

Consultants
The field functions of consultants are critical to the success of a project. Typically, the architect is responsible for notifying and coordinating consultants as well as ensuring their attendance on site at the appropriate times. Consultants usually review the portion of the work which they have designed or for which they are responsible. They also determine, whether their portion of the work is in general conformity with the contract documents. In addition, consultants assist the architect in preparing certificates by attesting to how much of their portion of the work has been completed. Consultants may also be involved with other inspection and testing procedures.

Contractor
The role of the contractor is described in a construction contract, such as CCDC 2, and in the project specifications. Generally speaking, the contractor is responsible for the construction schedule, the quality of construction, and the construction methods and procedures. The contractor is also responsible for supervising the crew and coordinating sub-contractors. Typically, if a project is of a certain minimum value, most contractors will assign one individual to manage the project. This person — known as the site superintendent — is usually assigned to only one project at a time, frequently setting up an office temporarily in a construction trailer or part of a building which is under renovation. The contractor usually contacts the architect at varying stages of the project to schedule reviews.

Construction Safety

The constructor (usually the general contractor) is solely responsible for construction safety at the workplace and for:

- complying with the rules, regulations, and practices required by the applicable occupational health and safety legislation;

- initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the work.

Neither the owner nor the architect is responsible for safety at the construction site, unless the owner has awarded separate contracts or is using the owner's own forces for parts of the project. Some provinces have legislation which defines the owner as the *constructor* in these situations. The architect should review all applicable provincial and territorial occupational health and safety legislation to determine the architect's responsibilities in the workplace.

If an unsafe or life-threatening situation is observed, the architect is obliged to report immediately to the contractor, and to record the observation. Architects do not have a contractual obligation to report safety issues on a site; however, architects have a responsibility in tort – as does every individual – to do so. If an issue is noticed and not reported, an architect may assume responsibility for, or be liable for, contributory negligence for those unsafe practices observed. Nevertheless, when developing the scope of the architect's services in discussions with the client, avoid inadvertently assuming responsibility for site safety, especially when offering full-time, resident or expanded field services. The architect should make it clear to the owner and the contractor that the architect is **not** responsible for:

- the means, methods, sequence, procedures, techniques or scheduling of construction activities;
- job-site safety;
- electrical and mechanical services

Conducting a Field Review

Procedures

The architect should establish credibility on the job site from the start of the project. This is accomplished through a detailed knowledge and understanding of the project and the contract documents. The architect must conduct reviews systematically. Upon completion of a field review, the architect should prepare written reports for the owner and the contractor and, when required, for building officials. Site observations should be consistent, responding to the stage, progress, and quality of the work.

Some architects bring reduced-size sets of drawings to the site. These are very useful for comparing observed work with the contract documents. Other required or important tools to bring on site are:

- hard hat and safety boots;
- camera (preferably with a time and date record);
- voice recorder and/or note pad;
- safety glasses;
- safety vest;
- tape measure.

Depending on the project it may be useful to provide a variety of other tools.

Upon arrival at the site, the architect should either:

- talk to the site superintendent or leave a note for the superintendent; or
- contact the contractor's other site personnel.

A site visit can include:

- a quick overview, to get a general impression of the progress of the work relative to the schedule and to the last site visit;
- a tour with the contractor and/or owner to understand their problems and concerns;
- a tour with the general contractor and a single sub-contractor to concentrate on key trades in progress at the time.

The architect should not leave the site without speaking with the site superintendent or the contractor. Observations should be reported to the contractor's superintendent at the conclusion of the visit in order to indicate to the superintendent any problems which have been noted.

The architect should endeavour to promote good communication and a close working relationship at all times with the contractor. However, if it is not possible to resolve on-site problems, the architect should ensure that the deficiencies are recorded in a field review report. Refer to "Checklist: General Items for Field Review" at the end of this chapter and to the many published checklists for:

- items to review during site visits;
- construction administration services.

Frequency and Timing of Site Visits

The architect should schedule site visits at intervals appropriate to the construction. The frequency and timing is left to the judgement of the architect. Visits should be conducted at different times of the day and on different days of the week. This prevents familiarity with the architect's routine and the scheduling of some construction when it might not be readily observed. In addition, it may be necessary to make strategically timed site visits to deter the contractor from becoming complacent about any contractual obligations.

Before processing progress claim applications, the architect must also visit the site and make detailed observations to determine:

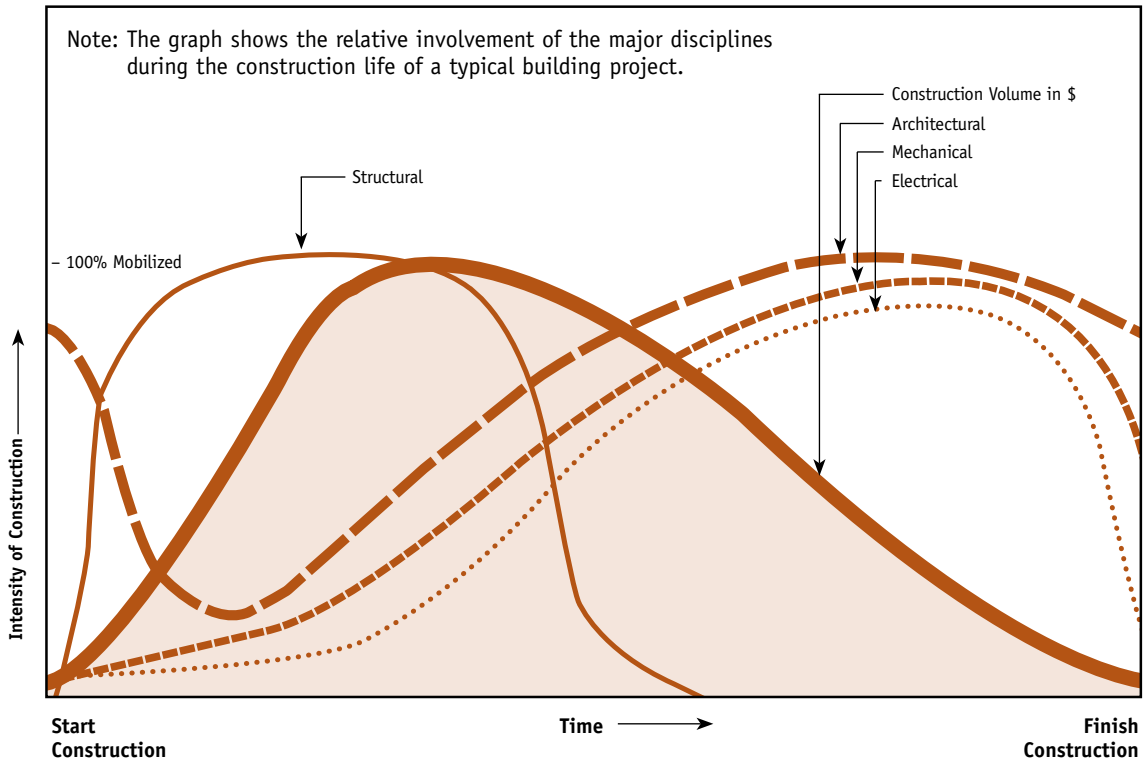
- the percentage of work completed;
- the amount of materials stored on site (or on the "extended site").

Usually, more visits are required at the start-up and close-out of construction as noted in Illustration 1. Structural engineering review is more intense at the early stages of a project, whereas mechanical and electrical consultants are more involved near the completion of construction.

The following are general guidelines on **when** to conduct field reviews:

- at project start-up and/or excavation;
- at the start of major sub-contractors' work on elements forming the enclosure of the building, such as:
  - forming and framing;
  - structural steel;
  - masonry;
  - waterproofing;
  - cladding;
  - window systems;

Illustration 1: Graph Showing Typical Duration and Intensity of Work on Site — By Discipline



  - roofing;
- at the start of finishing trades, such as:
  - floor finishes;
  - cabinetwork;
  - wall finishes;
  - painting;
- when significant new materials and equipment are delivered to the site.

Because many types of work (masonry, for instance) cannot be corrected readily without replacement, timely field review is needed to preclude rejection of work which has been underway for several weeks.

Additional field reviews should be considered immediately before and during concrete placement to review:

- key dimensions;
- placement of reinforcing steel and inserts;
- presence of any debris, rust, water, etc., within formwork;
- placement of electrical and mechanical services;
- concrete placement.

When the work of one trade is covered up by another trade, it is too late for observation; therefore, field reviews must be done before the following work is covered up:

- insulation;
- fireproofing/firestopping;
- vapour barriers;
- blocking and furring;
- electrical and mechanical services.

Scheduling reviews **before** work is covered up allows for deficiencies to be corrected prior to permitting the completion of the remainder of the installation.

The architect usually conducts a field review after any serious or unexpected change in the weather — which can have an adverse effect on work in progress — to determine whether any damage has been done to existing work, such as:

- undermining or weakening of footings or foundations by heavy rain;
- freezing of concrete or mortar due to sudden drops in temperature;
- frost penetration of sub-soil;
- damage to roofing membranes and unbraced walls by strong winds;
- improper curing or drying out of materials from prolonged heat.

Finally, the architect may:

- carry out a detailed review before the owner takes early occupancy of any area, prior to completion of the entire project;
- prepare a deficiency list for the contractor and the owner before partial occupancy takes place.

Field Locations

The architect may be required to make and record observations in three possible locations:

- the construction site;
- the "extended" site;
- the plant or location of off-site fabrication.

The Construction Site

The construction site — the location identified in the contract documents where the building is situated — is called "Place of the Work" in CCDC documents. This is where most of the construction activities take place and where the architect will conduct most of the field reviews, unless the building is prefabricated off-site.

Extended Site

An extended site refers to a location where products may be stored away from the construction site. The value of major items delivered to an off-site location may be considered eligible for payment, subject to the terms of the contract or once the following conditions have been met:

- after authorization or approval (usually for products which are costly or custom-made);
- after the contractor has made provision for:
  - secure storage (for example, a bonded warehouse);
  - insurance;
  - bonding;
- after the architect has made visits to observe the items at their storage location.

Plant or Off-site Locations

Review of work which is fabricated or assembled in a plant may also be necessary. The architect or consultants observe work in the plant to:

- examine the manufacturing facilities and capabilities of the sub-contractors before

a contract is awarded;
- check or confirm progress of items, such as:
  - items whose schedule for delivery is critical to the progress of the project;
  - items which come to the construction site pre-assembled and could not be properly reviewed after delivery;
- resolve problems noted by inspection and testing companies, such as:
  - truss welding details;
  - prefabricated wall panel details;
- resolve manufacturing problems concerning details which prove to be impractical, such as:
  - the size of metal breaks;
  - prefabricated wall panels;
- witness tests undertaken in the plant, such as:
  - tests for curtain wall mock-ups;
  - tests on specialized prefabricated roof structures;
  - tests of air diffusers;
- review mock-ups, such as:
  - elevator cabs;
  - special ceiling systems;
- determine the source of problems occurring in the field which can be traced to plant manufacture or fabrication, such as:
  - welding deficiencies;
  - efflorescence.

Reporting

The architect should write a report after every visit spent observing work in the field. The field review report may include the following information:

- name and position of the person conducting the field review;
- date, time, and duration of the visit;
- weather conditions, including any extreme conditions;
- names of those present or name of the site superintendent and the general contractor;
- percentage of work completed by trade;
- work progress compared to the contractor's schedule;
- work now underway or being accomplished;
- work scheduled to be completed before next visit;
- questions raised by the contractor or the owner;
- determinations made by the architect;
- outstanding issues requiring action;
- the list of people receiving copies of the report;
- status of deficiencies or outstanding issues from previous report;
- the report number for filing purposes.

Refer also to Chapter 2.4, *Sample Forms for the Management of the Project*, for a sample form for a field review report.

The architect should refer to one of the several available checklists for the review of building construction. Many checklists are organized by trade in the MasterFormat™ system. Architects can take the checklist to the job site and use it to assist in recording observations and writing field review reports.

Refer also to the RAIC Field Review / General Review Distance Learning Course, *Guidelines for Conducting and Documenting Construction Site Visits*, which includes 16 checklists.

Mock-ups

Mock-ups are usually full-scale, partial constructions of a certain system or building component. The contractor or sub-trade prepares a mock-up, when specified, to:

- demonstrate a full understanding of the drawings and specifications;
- uncover any problems;
- represent the quality of construction expected by the architect.

The architect should establish a schedule for construction of mock-ups and procedures for their review of at a pre-construction meeting.

Site Meetings

Pre-construction Meeting

The tone, format, and efficiency of all subsequent meetings is often set at the pre-construction meeting. The architect should be well prepared for this first meeting.

Before work commences on the site, the architect usually makes a detailed review of the site with the contractor, and documents the condition of the existing site (existing structures, sidewalks, etc.) in order to:

- establish the state of existing facilities

before work starts;
- provide a basis for settling any disputes arising from damages which may occur during construction.

Refer to "Checklist: Suggested Agenda for the Pre-construction Meeting," located at the end of the chapter, for issues to be discussed and resolved at this important first meeting.

Regular Site Meetings

One of the architect's responsibilities during construction is to participate in job-site meetings. The architect should be familiar with the progress of the job prior to any regularly scheduled job meeting. Regularly scheduled site meetings are essential to:

- communicate the client's expectations to the construction team;
- ensure good communication between all parties;
- exchange and transmit technical information such as shop drawings;
- provide a structured opportunity for field review;
- resolve problems and discuss all relevant design and construction issues;
- assist in making judgements and determinations;
- review schedules and progress claims.

Site meetings provide an excellent opportunity for the architect to establish an on-site presence. Minutes of the site meetings should always be recorded. They should indicate what actions are required and who is responsible for the action. Minutes should be distributed within 48 hours of the meeting. Either the architect or the general contractor prepares the minutes, depending on the architect's choice and the general requirements of the specifications.

Field Review Services of Consultants

The architect is usually the prime or "managing and coordinating" consultant, and is responsible for coordinating the field functions of the engineering and other consultants. It is important to call upon the services of the consultants at the appropriate stage of construction. All consultants should be required to submit field review reports in a format similar to that used by the architect, and the architect will distribute the reports as required. In addition, the architect relies on the consultants to determine the value or percentage of work completed by each respective discipline in order to prepare Certificates for Payment.

Engineers and other Consultants

The field review by engineers is critical to a successful building. The architect will normally:

- be familiar with the engineering work;
- note significant issues during site visits;
- bring those issues to the attention of the respective disciplines.

The role of consultants in the contract administration phase of the project follows the role of the architect. The engineers and other consultants should:

- review and provide the field functions as required at times appropriate to the stage of construction;
- provide written field review reports each time they visit the site.

Some aspects of review by engineering consultants differ from that of the architect. For example, some engineering disciplines — especially mechanical and electrical — provide information in a more diagrammatic manner than is presented in typical architectural drawings. Therefore, the trade or sub-contractor can use more discretion in the installation and operation of various equipment and systems. This diagrammatic information requires more interpretation on the part of both the engineer and the sub-contractor.

Testing Agencies and Inspection Services

Independent inspection provided by specialist inspection and testing firms is required on most construction projects. The following summarizes the relationship of these specialists with the architect:

- inspection and testing is usually recommended by the architect or the engineers;
- these specialists do not supersede the architect's authority;
- these services are ancillary to the architect's basic construction administration services;

- the architect must ensure that he/she is only assisting in the process and does not assume a contractual obligation;
- inspection and testing firms undertake tests and issue timely reports, but they do not interpret the results of these tests or issue instructions to the contractor;
- interpretations are made by the contractor in the first instance and finally by the architect and the engineering consultants.

Inspection and testing firms are frequently selected by methods typically used for selecting other professionals, that is, by soliciting proposals. The cost of these services is generally paid for by the owner who contracts:

- directly with the inspection agency; or
- indirectly through the general contractor.

Inspection and testing services are frequently paid through cash allowances provided for in the construction contract. Sometimes, inspection and testing services are included as a sub-contract. For example, air balancing is frequently a sub-contract of the mechanical contractor. Also, manufacturers' representatives — such as certain roofing membrane manufacturers — commonly inspect the installation of their products by the trades to ensure compliance with their standards.

The following are typical examples of inspection and testing required:

Division 03 — Concrete
- test for air entrainment
- slump test
- load testing on cylinders
- core drilling and testing
- inspection of placement of steel reinforcement
- X-ray of existing concrete slabs

Division 04 — Masonry
- mortar test and chemical composition
- testing of masonry units for compressive strength, absorption, etc.

Division 05 — Metals
- inspection of welds, fabrications, etc.
- field inspection
- inspection of load-bearing metal stud framing

Division 06 — Wood, Plastics and Composites
- special lumber grading

Division 07 — Thermal and Moisture Protection
- building envelope
- inspection of fireproofing and firestopping
- roofing inspections (installation and cut tests)

Division 09 — Finishes
- flooring and painting inspections

Division 14 — Conveying Equipment
- elevator testing and certification

Division 21 — Fire Suppression
- testing and certification of sprinkler systems

Division 23 — Heating, Ventilation and Air Conditioning
- air balancing

Division 25 — Integrated Automation
- testing of controls

Division 26 — Electrical
- testing of emergency lighting and emergency power supply

Division 27 — Communications
- testing of communications systems

Division 28 — Electronic Safety and Security
- verification of fire alarm system

Division 31— Earthwork
- additional geotechnical reports
- soil-bearing capacity
- approval of backfilling materials
- compaction of soils or fill
- load tests on, and inspections of, piles and caissons
- inspection of underpinning and shoring
- inspection of soil stabilization

Testing of complete systems, such as the building envelope, interior air quality, or integrated electrical and communications systems, may also be required.

Continuous On-site Representation

For certain large and complex projects, or some fast-track projects, continuous on-site representation is required. If provided by the architect, it is considered an additional service requiring negotiation of a fee over and above the basic fee. Alternatively, the client may choose to directly hire a clerk of the works. Usually, the responsibilities of a clerk of the works are limited and do not include contract document interpretation. The clerk of the works records construction activities and quantities, often for unit price contracts.

A continuous, on-site architectural representative may undertake some of the following duties:

- coordinating all communications;
- interpreting contract documents;
- assisting in the preparation of Change Orders and certificates;
- arranging for inspection and testing;
- preparing record drawings;
- attending site meetings;
- providing continuous field review and maintaining a daily log which contains:
  - weather conditions;
  - major material and equipment deliveries;
  - daily construction activities, percentage of completion of work, and work force;
  - records of work stoppages and reasons for them;
  - occurrence of inspection and testing and their results;
  - special visitors;
  - unusual conditions or significant developments on site.

The architect's role as a continuous, on-site representative should be carefully and clearly defined, and an appropriate fee negotiated with the client.

Definition

General Review: Visits to the place of work at intervals appropriate to the stage of the construction that the architect considers necessary to become familiar with the progress and quality of the work and to determine that the work is in general conformity with the contract documents.

References

Mahoney, William D. Editor. *Construction Inspection Manual*. Los Angeles, CA: Building News Inc., 1998.

Stitt, Fred A. *Construction Administration and Inspection Checklist: A Complete Guide For Exterior And Interior Projects*. New York, NY., Van Nostrand Reinhold Company.

The Royal Architectural Institute of Canada
Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six.

Field Review / General Review Distance Learning Course, *Guidelines for Conducting and Documenting Construction Site Visits,* 2003.

Appendix A — Tips for Site Observations – General

The architect undertaking field review should refer to one of the many published checklists for assistance in conducting site visits. The following is a partial list of very general matters to review on construction sites. Refer also to Appendix B – Professional Standards for Field Review / General Review.

Architectural Items

A1 **Aesthetics** includes the location and appearance of exposed mechanical and electrical components, particularly in areas exposed to view which should be finalized during roughing-in.

A2 **Cleaning** of trapped areas must be undertaken continually. The architect reviews and checks that accumulated dirt and dust is not allowed to build up and be covered up by the work of later trades. This includes dirt and food products left inside chase walls, above ceiling areas, and in interstitial spaces which could eventually find its way into areas occupied by the public. This also includes cleaning of areas such as cavity wall spaces which could affect the performance of weep holes.

A3 **Code Requirements** include stairs, exiting, life support systems, and anything which involves public health and life safety.

A4 **Datums and Tolerances** involve points used to determine floor levels with respect to outside grades or adjacent structures. Also required to maintain setbacks from other buildings or property lines and plumbness of vertical elements such as elevator shafts.

A5 **Deflections** require that appropriate allowances be made during and after construction for the deflections that will occur in beams, floors, and slabs as they are loaded. Beams and lintels above masonry and deflection of steel decking under roof parapets are typical examples.

A6 **Drainage** includes the provision of adequate slopes to drain water in floor slabs, pits and vaults, paving areas, and below slab weeping tiles. Inadequate slopes and drainage are a major cause of claims and litigation.

A7 **Expansion and Control Joints** must align with related joints in the building structure and at areas of expected movement. Joints should be consistent in all planes of the building envelope and interior, must not be constrained by construction, and must be allowed to expand and contract freely. The damage to the building fabric and visual impact of improperly designed joints are among the most significant problems with construction.

A8 **Fireproofing** of building structures requires checking the thickness and densities of materials. There must be sufficient room to apply spray on fireproofing, and it must not interfere with mechanical and electrical systems. Patching of damaged fireproofing must be undertaken so as to not impair the tested ratings of the system, and testing and inspection should be done by recognized testing companies.

A9 **Fire Protection** must maintain the required fire separations mandated by building codes. Provision must be made where fire separations are penetrated by other building systems such as mechanical and electrical systems as well as vertical services such as elevators and stairs. The materials used must meet current standards. Confirm that the materials have the required fire ratings, that they are installed by approved methods and in all required locations.

A10 **Hardware** on building projects is subject to substitutions and changes of hardware, changes of use or occupancy, and requested changes from Authorities Having Jurisdiction. The architect requests the hardware supplier to check and accept the methods of installation and confirm that the requirements of the occupants and Authorities Having Jurisdiction are met.

A11 **Humidity and Water Infiltration** trapped in wall and roof systems during the construction phase can lead to problems with rot and damage. The architect checks for excessive moisture in insulation materials, windows, and roofing systems. Excess humidity during the installation of many building materials will also lead to long-term problems. Gypsum board or acoustic ceiling panels will swell or sag when subjected to moisture levels exceeding permitted levels.

A12 **Mechanical and Electrical Equipment** such as elevators, escalators, fans, pumps, and operable doors, etc., require break-in periods. To avoid excessive breakdowns and callbacks by the contractor, these break-in periods should be done before the owner accepts the building. Access panels and other items require coordination with architectural finishes.

A13 **Operating space** is required to allow maintenance operations to be undertaken when the building is turned over to the owner. This includes space to allow staff easy access to filters, fans, valves, air handling equipment, and life safety items. The architect checks that equipment is installed so that maintenance and replacement is simplified and also so that space is available to move equipment in and out. This includes doors, access panels, and corridors.

A14 **Public Safety** requires that proper hoarding, overhead protection and scaffolding, and barriers be provided. The architect should be aware that the contractor is responsible for controlling the site and its safety. If the architect sees a potential problem, the architect should report this immediately to the project site superintendent; however, the architect does **not** make any recommendations as to how the safety problems should be solved.

A15 **Wall and Floor Thicknesses** should be confirmed on site to ensure that they are sufficient to conceal the services which are to be installed inside them. Typical services include ductwork, plumbing and waste stacks, washroom equipment, etc. The architect makes observations to ensure that any required fire resistance ratings are maintained where services are installed in walls or in furred-out walls. Services which are installed in concrete floors should also be reviewed so that sufficient cover remains to ensure that the fire rating is maintained or the structural requirements are not impaired.

A16 **Water** in new construction poses particular problems because systems installed on wet or damp substrates can have long-term problems. When materials such as bituminous membranes are installed on wet concrete or damp masonry, the adhesion may fail. The contractor should be made aware of the importance of protecting all sensitive materials and the strict adherence to manufacturers' requirements for moisture content.

Appendix B - Professional Standards for Field Review / General Review

Introduction

Terminology

The terms "Field Review" and "General Review" are used interchangeably in various parts of Canada; they have the same meaning and force in law and form an essential component of the architect's services during the construction phase of a project. For convenience, this service will be referred to in this document as **field review**.

Purpose

The purpose of this Appendix is to summarize:

- the professional standards which the architect must maintain when performing field review services;
- the scope of professional services required during field review;
- the determination of the appropriate fee related to the agreed field review services;
- recommended reporting formats.

Professional Standards

Successful contract administration means that the architect must effectively integrate the administration of the services provided in the office with field reviews carried out on the site. Regardless of which project delivery method is used, all architects must always follow best practices during field review because these services form a significant part of architectural services to the client.

The frequency, number and extent of field reviews required on a specific project is the prerogative and professional responsibility of the architect who should resist any attempt by the client to dictate the number of visits or to limit the amount of fee for field review services. Substantial settlements (payments resulting from a claim) have resulted when architects have limited their field review visits under pressure from their clients. The Courts have made it clear that there is an expectation for the architect to conduct a field review process that meets recognized professional standards, regardless of the fee or, in the alternative, to withdraw from the project.

The architect's aim should be to keep ahead of events on the site and to assist the construction process in running smoothly (which is clearly to the advantage of the owner, the architect and the contractor), in order to achieve the desired end result without undesirable compromises. The architect must identify to the contractor all specific events about which advanced notification is required, particularly in relation to the scheduling of the portions of the work which will require:

- pre-construction meetings;
- special inspections or testing.

The architect must also monitor the work of consultants.

Scope of Field Review Services

Services identified as "*supervision*" or "*inspection*" are not normally provided by an architect.

Field review, as defined in the client/architect contract, is intermittent, neither constant nor comprehensive:

- field review is based on a systematic, random sampling of the work;
- the architect is entitled to rely on the contractor's consistency for the quality of the work.

The contractor, under contract with the client, has contracted to construct a building which is in general conformance with the contract documents. The ability of the architect to enforce this intent varies and depends on the type of project delivery method used:

- the greatest level of control is under a stipulated price contract (such as CCDC 2);
- the least control will likely occur when the client is an owner-builder, whose objectives may be restricted to quick completion at the lowest possible cost;
- the various forms of construction management and design-build contracts fall between these extremes.

The two broad categories of field review services are:

- **Matters required by the Building Code:**
  These services are a regulatory requirement and they must be performed. The usual practice is for these services to be provided by the project's architect, but others who are qualified to do so may be engaged by the client.

- **Contractual Matters or "good practice":**
  These are matters related to workmanship, appearance, accuracy, etc. and they go beyond the review required for code-related matters. These services should be set out in a schedule of the scope of services in the client/architect contract (**Canadian Standard Form of Contract for Architectural Services –Document Six 2002**).

Essential elements of field review for building code matters include:

- site visits;
- written reports;
- changes to the work;
- shop drawings;
- coordination of consultants.

Elements of field review for "good practice" matters are similar, except that:

- the architect will identify, as a matter of professional judgement, which shop drawings for non-Code items will require review by the architect;
- these elements should be predetermined and set out in the contracts - between the client and contractor, and between the client and architect (such as in the *Schedule of Architect's Services* in Document Six).

Fees for Professional Services for Field Review

The following are procedures to determine the fee for field review services:

1. If engaged for field review, confirm whether the services will include non-Code matters (Building Code matters should always be part of the fee);
2. Establish a draft of appropriate services for the specific project;
3. Define the scope of services which address these;
4. Discuss the field review process and appropriate fee with the client;
5. Make adjustments as required;
6. Review with consultants.

Be aware of obligations required by the Building Code and by the relevant provincial Architects Act, such as preparing and submitting field review reports to the municipality having jurisdiction over the project. Remember that if contracted to certify payments to the contractor, the architect is then required to provide field review for both Building Code and non-Code matters. Field review, as well as payment and substantial performance certification, are included in the definition of contract administration in the standard client/architect contract.

If the municipality requires shop drawings of Code-related matters to be submitted for their records, advise the client that the cost of making these submissions is included in the fee for contract administration.

Evaluate the time required to provide field review services appropriate to the specific project, calculate the fee, and review it in detail with the client prior to signing the client/architect contract. The client/architect contract should record:

- the agreed-to scope of services;
- the related fees, and
- an amending provision to adjust the contract should circumstances differ from what was agreed.

Circumstances which were not anticipated originally may require renegotiation.

Many factors affect the ability of the architect to prescribe fully, at the time of preparing the client/architect contract, the number, frequency and extent of site visits, however, some of the following factors can be predicted with some degree of accuracy and should be considered in establishing the fee:

- size and complexity of project;
- type of construction contract and method of project delivery;
- experience of the client with construction matters;
- requirements for submission of Code-related shop drawings to the municipality having jurisdiction over the project.

These are known prior to the execution of the client/architect contract and should be identified in the contract and the related costs included in the fee.

Other factors cannot be predicted accurately, such as:

- varying weather conditions;
- quality of workmanship of trades;
- performance of general contractor and its personnel assigned to project;

Review the provisions made in the contract to allow for these uncertainties with the client and advise the client that the scope and fee may need to be re-visited if changes in the scope of services occur due to circumstances unforeseen at the time of execution of the contract.

Procedures

1. Review and bring to the attention of the chief building official all changes that may affect Code compliance, including shop drawings for Code related matters that are at variance with the permit documents;
2. Review and comment on shop drawings and samples for Code compliance to determine general conformity with the design concept (the architect may also review shop drawings for non-Code matters);

It is prudent to consider the impact on Building Code requirements of each Proposed Change and to obtain approval from the chief building official before finalizing Change Orders.

The architect is usually engaged to coordinate field review activities of other consultants (whether or not engaged by the architect) which include, for their respective disciplines:

- site reviews;
- written reports;
- review and comment on the costs quoted for changes to the work;
- shop drawings and samples;

Refer also to “Checklist: Coordinating Consultants” (Chapter 1.2.3 - Consultants).

In some instances, the architect may be working under a prime consultant (another architect or a professional from another discipline) whose responsibilities will include coordination services for the project; in these circumstances the Code requires the architect to cooperate with the prime consultant providing coordination of other consultants.

Conclusion

In the final analysis, whether or not the architect has exercised appropriate professional judgement in attending at the site, including when or how often these attendances should have occurred, will be determined by a panel of the architect's peers, in the case of complaints and discipline hearings, or by a judge or arbitrator, in a matter of a claim against the architect.

Definition

General Review/Field Review means review during visits to the *Place of the Work* (and where applicable, at locations where building components are fabricated for use at the *Project* site) at intervals appropriate to the stage of the construction that the *Architect*, in his or her professional discretion, considers necessary to become familiar with the progress and quality of the *Work* and to determine that the *Work* is in general conformity with the construction documents.

(*Canadian Standard Form of Contract for Architectural Services –Document Six 2002–* Definitions)

References

RAIC Professional Development Course, Distance Learning Kit, *Field Review/General Review* with CD-ROM which includes:

- *Guidelines for Conducting and Documenting Construction Site Visits*
- *Checklists*

OAA Practice Bulletins: A.10 series

Checklist: Suggested Agenda for the Pre-construction Meeting

1. **Introduction**
   - all attendees and who they represent.

2. **Administrative Procedures**
   - schedule of meetings;
   - who will record and distribute minutes;
   - format of minutes;
   - general communications;
   - procedures for distribution and routing and for the review and/or approval of information, including:
     - correspondence;
     - shop drawings, including format, turn-around time, etc.;
     - samples, including mock-ups and schedule;
     - substitutions;
     - tests and inspections, including identifying companies and reporting circulation;
     - progress payments;
     - Change Orders, including procedure and forms.

3. **Project Team Directory**
   (as per Form 1.5 of Chapter 2.4, *Sample Forms for the Management of the Project*)

4. **Current Project Status**
   - receipt of:
     - building permit;
     - insurance and bonds;
     - certificates of good standing from Workers Compensation Board;
   - identification of Authorities Having Jurisdiction;
   - permits for gas, electrical services, other utilities, etc.

5. **Job Site Documents**
   - permit set;
   - codes and standards;
   - geotechnical report.

6. **Review of Information from Contractor,** including:
   - construction schedule;
   - schedule of values for progress draws;
   - cash flow projections.

7. **Site Issues**
   - parking;
   - loading and storage;
   - garbage, construction waste, and recycling requirements;
   - hoarding and fencing;
   - tree protection;
   - project identification and signage;
   - snow removal;
   - operational constraints (use of existing washrooms, maintenance of existing services, etc.);
   - hazardous materials (handling and disposal).

8. **Construction Services and Utilities,** including:
   - water;
   - heat;
   - light;
   - power;
   - toilets;
   - construction office;
   - communications systems.

9. **Requirements for Pre-construction Surveys**
   - recording existing conditions;
   - setting out of foundations, establishing property boundaries.

Checklist: General Items for Field Review

1. **Permits and Inspections**
   - determine whether the contractor has arranged for all permits and inspections required for compliance with local, provincial, and federal regulations, including:
     - building permits;
     - environmental permits, if applicable;
     - safety and labour department permits.

2. **Code Requirements**
   - observe whether construction is proceeding in accordance with the requirements of applicable codes:
     - the contractor is responsible for compliance with all regulations for construction methods;
     - the architect is responsible for design.

3. **Shop Drawings and Samples**
   - confirm that the contractor has reviewed copies of all applicable shop drawings on site and they are being used for construction;
   - confirm that approved samples are kept on site for reference and comparison with the completed work.

4. **Mock-ups**
   - before the work commences, have the contractor prepare on-site mock-ups and retain them for reference for:
     - the work of certain trades;
     - significant repetitive elements;
   - mock-ups allow tradespeople to see what impact and interface is required between trades before work begins on, for example:
     - masonry walls;
     - through-wall flashings;
     - window installations;
     - roofing and flashings.

5. **Materials and Equipment**
   - review materials and equipment immediately after delivery to the site for conformance to the contract documents by the architect or the consultant;
   - advise the contractor to store materials so that they can be readily observed.

6. **Fabrication**
   - a visit to the plant for certain critical work and items with a long lead time may be warranted.

7. **Workmanship**
   - remind the contractor of the required quality of workmanship:
     - from the start of the project;
     - through the contractor so that all trades are aware of the standards;
   - make frequent spot checks so that the standards established initially are maintained.

8. **Handling and Storage**
   - note the methods of delivery, handling, and storage of materials and equipment;
   - observe whether these meet applicable standards and no damage to the project or materials will result.

9. **Protection**
   - observe:
     - insulation exposed to sunlight;
     - masonry exposed to rain or snow or wind;
     - millwork and carpentry exposed to the elements;
     - structure overloaded by pallets of materials concentrated close together.

10. Erection and Installation

- the contractor is solely responsible for construction methods:
  - the architect risks incurring liability by offering suggestions;
- during the installation and erection of work, the architect checks the procedures being used by reviewing:
  - specifications;
  - notations on shop drawings;
  - agreed-to instructions and correspondence;
- the architect reports any concerns about erection procedures for structural work to the structural engineer immediately.

11. Relation to Prior Work

- review the work of trades already completed;
- establish with the contractor whether corrective work is necessary before the work of the next trade contractor begins;
- request the contractor to obtain acceptance of the previous work by the next trade contractor, for example, acceptance of:
  - steel decking before installation of roofing;
  - concrete floors before installation of finish flooring;
  - gypsum board substrates before painting.

12. Cooperation Between Trades

- review with the contractor the need for coordinating the work between trades;
- observe whether the trades are cooperating and that one is not disregarding the requirements of another;
- make proper interference drawings available, especially drawings for the mechanical and electrical trades showing:
  - ductwork;
  - sprinklers;
  - lighting fixture layouts.

13. Clean-up and Safety

- check that the site is being maintained in a clean and safe condition;
- an untidy site indicates potential problems:
  - fire hazards;
  - accidents;
  - lowered productivity;
  - Authorities Having Jurisdiction may close the work down if serious problems are not rectified;
  - the owner may develop a negative image of both the contractor and the architect, even though the architect has no control over how the work is being performed;
- if unsafe working conditions or practices are evident, notify the contractor's superintendent immediately and record the notification and circumstances;
- if action is not forthcoming, report immediately to the proper authorities.

14. Inspection and Testing

- establish that arrangements with the inspection and testing companies have been made and verify that:
  - representatives of those companies are or have been on site when required;
  - necessary test or control procedures are being made;
  - detailed reports are being prepared and issued.

(Refer to "Testing Agencies and Inspection Services" earlier in this chapter.)

15. Contract Document Review

- check the work against:
  - original contract documents;
  - addenda;
  - Change Orders;
  - Supplemental Instructions.

16. As-Built Drawings

- remind the contractor to update the drawings regularly as the work progresses.

17. Site Visits with the Owner

- make visits with the owner as the work of various trades is completed;
- make a site visit or series of visits with the owner's representative before the work is accepted.

Checklist: Final Field Review

Review Items	Observations	NBC Reference
STRUCTURE	❑ complete	
	❑ window cleaning anchorage systems	
	❑ final review conducted by P. Eng	
HVAC	❑ complete & operational	
	❑ fire dampers at all fire separations	3.1.8.7.-3.1.8.9.
	❑ venting of commercial cooking equipment	6.2.2.6.
	❑ smoke control verification in high buildings	3.2.6.10.
	❑ final review conducted by P. Eng	
PLUMBING	❑ complete, tested & operational	
	❑ backflow prevention devices installed & tested	7.1.2.1.
	❑ final review conducted by P. Eng	
ELECTRICAL	❑ supply, lighting & heating complete & operational	
	❑ emergency lighting	3.2.7.3.
	❑ emergency power	3.2.7.4.
	❑ final review conducted by P. Eng	
BUILDING ENVELOPE	❑ environmental separation	5.1.4.2.
	❑ thermal resistance	5.3.1.1.
	❑ precipitation protection	5.6.1.1.
	❑ grading for surface water	5.7.1.1.
FIRE ROUTES	❑ open & accessible	3.2.5.5.-3.2.5.6.
	❑ minimum 6m width	
	❑ capable of supporting response vehicles	
FIRE ALARM & SUPPRESSION	❑ fire alarm system tested & verification report	3.2.4.
	❑ firefighting water supply & hydrant location	3.2.5.7.
	❑ standpipe system, fire hose cabinets & extinguishers	3.2.5.8.-3.2.5.12.
	❑ sprinkler/extinguishing system tested & operational	3.2.5.13.
	❑ fire department siamese pumper connections	3.2.5.16.
	❑ firefighters' elevator	3.2.6.1., 3.2.6.5.
GUARDS	❑ balconies	3.4.6.5.
	❑ stairs & landings & where drop exceeds 600mm	
	❑ windows & transparent doors	3.3.1.18.
	❑ height, openings & climbability	3.4.6.5.
	❑ load capacity	4.1.10.1.
	❑ retaining walls	

✕ NOT APPLICABLE ✓ IN COMPLIANCE ● NOT IN COMPLIANCE ❋ SEE COMMENTS

Review Items	Observations	NBC Reference
FIRE SEPARATIONS & FIRE RESISTANCE	❑ firewall integrity	3.1.10.
	❑ conformance of specified assemblies	
	❑ verification of spray fireproofing	
	❑ exits	3.4.4.1.
	❑ floors	
	❑ mezzanines & interconnected floor spaces	3.2.8.1., 3.2.8.2.
	❑ loadbearing columns supporting rated assemblies	3.1.7.5.
	❑ roofs	
	❑ spatial separation for exterior walls	3.2.3.
	❑ public corridors	3.3.1.4.
	❑ between occupancies	3.1.3.1.
	❑ between suites	3.3.1.1.
	❑ garbage, mechanical service, janitor rooms	3.6.2.
	❑ shafts	3.6.3.
	❑ labeled door, frame & other closures	3.1.8.
	❑ firestopping	3.1.9.1., 3.1.11.
	❑ combustible piping penetrations	3.1.9.4.
	❑ hazardous substances – Fire Code compliance	3.3.1.2.
EXITS	❑ separation integrity	3.4.4.4.
	❑ door swing direction	3.3.1.10., 3.4.6.11.
	❑ door hardware, latching, & self closing devices	3.1.8.11., 3.1.8.13.
	❑ panic hardware, hold open & electromagnetic release	3.4.6.15.
	❑ handrails, continuous one side	3.4.6.4.
	❑ uniform rise & run	3.4.6.7.
	❑ exit signs	3.4.5.
	❑ lighting	3.2.7.1.
	❑ unobstructed safe egress at grade	
BARRIER-FREE ACCESS	❑ exterior walk & ramp to parking	3.8.3.2., 3.8.3.4.
	❑ entrance threshold	3.8.3.3.
	❑ door operator	3.8.3.3.
	❑ washroom clearances & fixturing	3.8.3.8.-3.8.3.12.
	❑ handrail extensions	3.4.6.4.
	❑ signage for parking, entrance, washrooms	3.8.3.1.
	❑ corridor obstructions affecting visually impaired	3.3.1.9.(3)
UNFINISHED BUILDING OCCUPANCY	❑ compliance within occupied areas	
	❑ housekeeping	
	❑ authority to occupy permit obtained	
AS-BUILT CONFORMITY	❑ consistency with approved documents	2.6.2.1.
	❑ authorization for changes obtained	
COMMENTS		

✕ NOT APPLICABLE ✓ IN COMPLIANCE ● NOT IN COMPLIANCE ❊ SEE COMMENTS

Checklist: Architect's Role in Soils and Materials Testing

Notes
Soils and materials testing agencies are generally arranged by the architect on behalf of the client. Their fees are paid by the client, either directly, or indirectly through allowances included in the contract price. *For convenience, these are referred to as 'agencies' in this document.*

Manufacturers' representatives commonly inspect the installation of their products to ensure compliance with their standards and there is no additional cost to the client for these services. The architect is normally responsible for the coordination of these agencies. The basic services and principles for coordination should be affirmed/clarified by the architect as early as possible.

Comments, clarifications or recommendations are in *italics*
Use of a forward slash (/) signifies *and* or *or*

Refer also to "Checklist for the Management of the Architectural Project" in Chapter 2.3.1 *Management of the Project,* Chapter 2.3.4 *Pre-design* and Chapter 2.3.11 *Contract Administration - Field Functions*

Pre-agreement

1. Defining expectations:

❑ Before beginning negotiations with potential agencies prepare clear definition of expected performance for each specialty, including:

a) extent of participation by agency during design/documentation stages: *(this is more relevant to some specialties than others such as design consultation from a roofing inspector)*

b) knowledge of/commitment to current practice in specialities such as sustainable design or embodied energy

c) contract administration procedures:
  i) site attendance:
    - on demand:
      - expected notification
      - normal/emergency response time
    - regularly scheduled *for work continuing over extended time period*
    - off-site locations *fabricating/ manufacturing plants*
  ii) reporting, including :
    - frequency of reports *(some agencies may accumulate reports and submit them monthly, unless instructed otherwise)*
    - measuring quantities *additional excavation/backfilling*
    - procedures when emergencies occur
  iii) site instructions, including policy for prior authorization/approval
  iv) review of change quotations *as requested*

❑ review past performance of previously engaged agencies. Review unsolicited offers of service from agencies not previously engaged

❑ Seek confidential recommendations on unfamiliar agencies from colleagues/clients *(Some clients may have ongoing service contracts with specific agencies and will instruct architect accordingly. Concern for due diligence may indicate that seeking independent recommendations on the client's selected agency is advisable. In this case, the client's approval should be obtained in advance, and all information obtained reported*

to the client. Confidentiality of comments received must be respected, therefore the architect is obliged to obtain original source's permission to report his comments, or maintain confidentiality of source, if so requested)

- ❑ Prepare short list of agencies selected *(formerly engaged/new)* to interview
- ❑ Develop score sheet for use during first interviews for consistent recording/rating of agencies' responses

2. Interviews

(separate preliminary discussions with each of selected agencies to confirm that agency understands/accepts architect's performance expectations)

- ❑ Encourage agency to describe their procedures in dealing with architects
- ❑ Confirm adequate professional liability insurance
- ❑ Make notes on score sheet

3. Following Interviews

- ❑ Review score sheets for each agency
- ❑ Eliminate unsuitable agencies
- ❑ Prepare formal Request for Proposals (RFP) letter for selected list of agencies
- ❑ Different letters will be required for each specialty, but each should include:

a) statement of expectations, confirming topics presented during interview *(specific performance requirements should be stated in detail in initial RFP letter)*

b) description of project, giving as much information as possible:
- project name/client/location
- site
- target date for completion

c) proposed schedule *as relevant to required testing/inspection:*
- pre-design/documentation
- construction

d) fee basis:
- lump sum
- percentage
- unit rates

e) request to confirm/provide:
- acceptance of performance expectations
- ability to meet timetable
- proof of professional liability insurance

4. Appointment of Agencies

- ❑ Review proposals and verify acceptance of performance expectations/adequate professional liability insurance
- ❑ Analyse any additional conditions *agree or reject*
- ❑ Select best proposal for each specialty *(may not be the cheapest if expected performance is superior)*
  - Recommend to client to engage selected agencies *for pre-design testing work*
  - Instruct contractor to engage selected agencies *for work during construction phase*
- ❑ Notify successful agencies
  - Arrange for client to sign formal agreements *for pre-design testing work*
- ❑ Advise unsuccessful agencies *(this maintains good relations: you may want to consider engaging them in future)*

Pre-design - Geotechnical Inspection and Testing (soils)

1. Define scope of work:

a) review requirements in consultation with:
- structural engineer
- testing agency

b) establish number/locations/depth of boreholes for:
- soil/rock sampling
- penetration tests
- moisture content
- groundwater observations

c) other tests *as required*
- probes if rock encountered at shallow depth
- test pits
- percolation tests

2. Define information required:

a) overburden *(usually requiring removal from site, except for topsoil which may be salvageable for use in landscaped areas)*

b) organic material: thickness/depth/layers

c) fill/other non-native material
- moisture content

d) soil/rock type:
- character/formation/origin
- moisture content
- bearing capacity
- depth to bedrock
- inclination of rock surface

e) water table

f) soil analysis

g) unusual conditions, including:
- flowing ground water
- quicksand
- loose rocks/boulders

Report

h) borehole location plan

e) borehole logs

j) soil analysis:
- soil classifications
- stratification
- penetration values
- moisture content

k) recommendations for:
- i) allowable bearing pressure
- ii) foundations, including:
  - design
  - bearing level
  - necessity for skim slab to protect excavated surfaces prior to concrete pour *as required*
  - earth cover to protect footings from frost action *as required*
  - angle of repose for cut slopes
- iii) floor slab construction:
  - compaction of exposed subgrade *by proofrolling, etc. as required*
  - compacted sub-base
- iv) pavement construction:
  - compaction of exposed subgrade *as required*
  - compacted base/sub-base
- v) excavation/handling of rock slabs *as required*
- vi) groundwater control
- vii) special requirements for unusual conditions such as deep foundations or engineered fill

l) confirm project schedule/deadlines

Commonly Specified Inspection and Testing Services during Construction

Charges for these services are usually paid from specified Inspection & Testing allowance or included in contract price of relevant sub-trade. Payment for retesting/reinspection of work found defective following initial inspection, or as otherwise made evident, is responsibility of contractor

- ❑ In all cases, agreed contract administration procedures must be followed for:
  - site attendance
  - reporting
  - lines of communication
  - site instructions
- ❑ Monitor each agency's performance and advise promptly if not satisfactory

Additional Geotechnical Inspection and Testing Services

- ❑ Additional boreholes to augment those taken earlier *may be required as unusual/unexpected conditions become evident as excavation/site work proceeds*
- ❑ Tests of soil-bearing capacity
- ❑ Test pits *as required*
- ❑ Observation/measurement of:
  - additional excavation of unacceptable material
  - related additional backfilling *as specified*
  - boulders over specified size
  - *charges for the above measured quantities are usually at unit rates quoted at time of bidding*
  - topsoil salvaged for re-use

Backfilling

- ❑ sieve analysis of proposed fill materials
- ❑ compaction tests including frequency and number of tests per specified area or at specified lift interval
  - undisturbed excavated surfaces prior to backfilling/placement of footings
  - backfilling under floor slabs/paving
  - backfilling against walls
  - backfilling at site areas following removal of unacceptable material

Asphalt Paving

- ❑ compaction tests:
  - sub-base
  - base
- ❑ inspection of asphalt placement:
  - mixture temperature
  - placing
  - rolling

Special Foundations

- ❑ caissons:
  - drilling
  - bearing surface
- ❑ piles, including:
  - driving of piles
  - load tests
- ❑ underpinning
- ❑ shoring

Concrete

- ❑ air entrainment
- ❑ slump
- ❑ cylinder tests, specified frequency for each test (at least once per prescribed quantity delivered/placed or each placement day)
- ❑ core drilling *as required*
- ❑ load tests *as required*
- ❑ reinforcement, including:
  - bar sizes
  - placement
  - tying
  - chairs/spacers

Masonry

- ❑ masonry materials *as required*:
  - absorption rate for clay brick
  - mortar
  - masonry ties

Structural Steel

- ❑ off-site fabrication:
  - mill test reports
  - materials/products as specified
  - conformance to reviewed shop drawings, including:
    - correct sizes
    - fabrication/erection tolerances
    - welding
- ❑ field assembly, including:
  - bolting
  - welding
  - plumbness/alignment/level
  - base plate grouting/removal of shims

Steel Decking

- ❑ mill test reports
- ❑ no damaged/deformed materials incorporated in work
- ❑ attachments, including:
  - welding
  - button punching
- ❑ reinforcing at openings
- ❑ edge closures, including:
  - flute closures
  - bent plate edge forms

Metal Fabrications

- ❑ handrails/guards, including:
  - fastenings
  - vertical/horizontal load capacity *as specified*

Membrane Waterproofing

- ❑ pre-construction conference
- ❑ condition of substrate
- ❑ installation, including:
  - daily or more frequent inspections throughout duration of work *as required*
  - substrate preparation
  - application

Sprayed Plaster Fireproofing

- ❑ conformance to product data/test reports, including:
  - bond to substrate
  - thicknesses for required ratings

Roofing

- ❑ daily or more frequent inspections throughout duration of work *as required*
- ❑ condition of substrate such as steel deck/ concrete slab
- ❑ inorganic moisture-resistant rigid underlayment
- ❑ vapour retarder, including:
  - mopped in/adhesive fixed *as required*
  - placement of adhesive
  - sealed at:
    - all laps
    - terminations
    - perimeter air/vapour barrier(s)
- ❑ insulation, including:
  - mechanical fastening/mopped in *as required*
  - joints/ends staggered
  - fitted around drains/vents/curbs/ abutting construction
- ❑ roofing membranes, including:
  - mopped/torched *as required*
  - membrane/bituminous flashings
  - granular surfacing *as required*
  - temporary water cut-offs
  - control joints

- ❑ roof pavers/roof protection course
- ❑ sheet metal flashing, including:
  - fabrication
  - joints
  - corners
  - underlay *as required*
  - backpainting *as required*
  - provision for expansion
  - caulking

Sealants

- ❑ field quality control provided by manufacturer's representative *as specified*, including :
  - substrate preparation
  - application of packing and sealant

Finish Hardware

- ❑ field quality control provided by manufacturer's representative *as specified, including:*
  - installation
  - operation/adjustments as required for items such as door closers, automatic door openers

Flooring

- ❑ field quality control provided by manufacturer's representative *as specified* for:
  - resilient sheet flooring, including:
    - seam welding
    - integral cove bases
  - carpeting

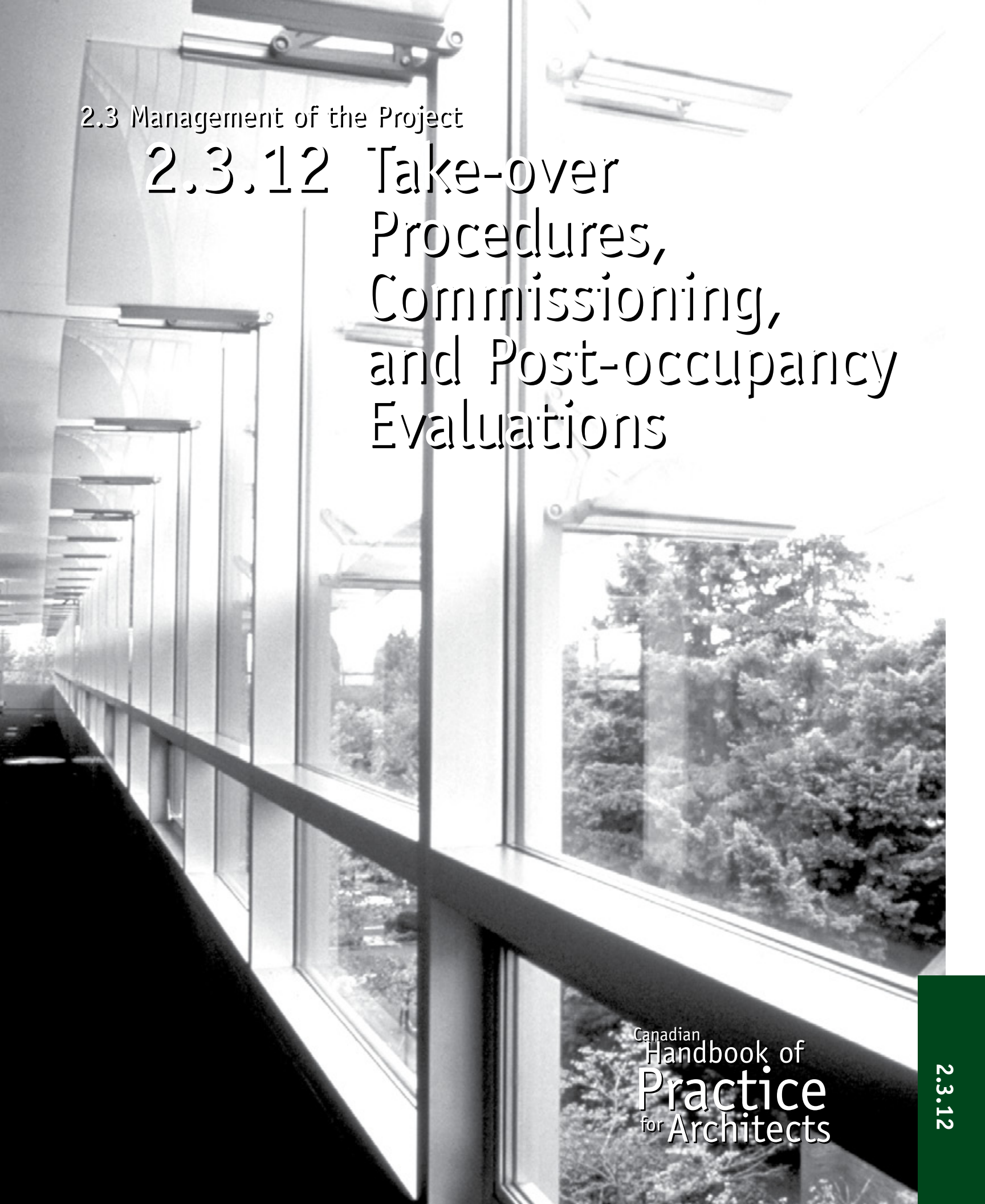
Painting & Finishing

(NOTE:several provinces now have quality assurance programs offered by their provincial Painting Contractors' Associations (PCA). Costs of the program are included in the contract price. These services are recommended for specification by architects, if available. Such programs include:

- ❑ *Approved Product Lists for all Canadian paint manufacturers, listing Coating and Finishing Systems for all exterior and interior conditions*
- ❑ *Warranty/Guarantee, either:*
  - *PCA 2 year Guarantee for PCA members*
  - *Maintenance Bond for non-PCA painting contractors*
  - *Field Quality Control independent inspection service)*
- ❑ Field quality control provided by independent inspection *as specified:*
  - condition of substrate, including:
    - clean/dry/free of imperfections
    - no adverse moisture content/alkalinity
  - preparation, including:
    - products from PCA Approved Products Lists *as specified*
    - priming/filling
    - ventilation
    - temperature
  - application, including:
    - coverage
    - touch-up
    - finished appearance

Special Finishes

- ❑ field quality control provided by manufacturer's representative *as specified*
- ❑ dry film coating thicknesses *as specified*



2.3.12 Take-over Procedures, Commissioning, and Post-occupancy Evaluations

Introduction

Take-over Procedures
- Substantial Performance
- Certification of Release of Holdback
- Final Certificate for Payment
- Letters of Assurance
- Final Submissions
- Occupancy

Commissioning
- Pre-occupancy Services
- Component Verification
- Systems Verification

Warranty Review

Post-occupancy Evaluations

Definitions

References

Appendix A – Letter to Client at Project Completion

Checklist: Maintenance of Architectural Components

Checklist: Replacement of Building Components

Take-over Procedures, Commissioning, and Post-occupancy Evaluations

Introduction

As the construction of a project nears completion or after the building is complete, the architect continues to provide professional services to the client. Some of these services include:

- take-over procedures;
- commissioning;
- post-occupancy evaluation.

Take-over procedures are a normal part of the architect's basic services performed at the end of contract administration. After take-over, the architect is responsible for reviewing defects and deficiencies during the warranty period and for notifying the contractor of items to be corrected. Most client-architect agreements terminate after the one-year warranty period. Therefore, work extending beyond this period is an additional service.

Commissioning is a systematic process of ensuring that new building systems perform interactively according to the documented design intent and the owner's operational needs, and that specified system documentation and training are provided to the facility staff.

Commissioning is a term often misused to refer to those activities that occur when a project is taken over by the client. In actual fact, commissioning is a separate and distinct service, which may commence at the beginning of a project and may continue until occupancy by the owner. Take-over, by contrast, starts when a project nears construction completion. Commissioning is an additional service often provided by an independent third party — a commissioning agent. Large or complex projects may require the participation of a commissioning agent to manage and verify the performance of all the components of the building's operation, in particular testing and balancing of mechanical and electrical systems. [Note: some clients continue to use the term "commissioning" to describe take-over procedures.]

Post-occupancy evaluation is a service provided to investigate and assess the performance of completed buildings. The evaluation may examine the technical performance of a system or an assembly such as the building envelope, or functional performance such as the efficiency of the layout of the building's interior.

Following occupancy, the architect often:

- reviews the effectiveness of the architectural practice's in-house procedures;
- records information about the project for future reference;
- prepares presentation material for incorporation into the practice's promotional material.

Take-over Procedures

Take-over procedures are required for the orderly take-over and transition of the building project by the owner. They are also necessary to protect the interests of the owner, the contractor, and the architect. Architects should be thoroughly familiar with the lien legislation in the province or territory where the project is located.

Refer to the references at the end of this Chapter, for a web link to the lien legislation in each province and territory.

Substantial Performance

The first step in the take-over process is certification of substantial performance of the work. Under the terms and conditions of CCDC 2, *Stipulated Price Contract*, and if permitted by the local lien legislation, the contractor may apply for early release of the holdback related to a sub-contractor's or supplier's work which was substantially performed earlier (such as structural steel fabrication and erection). The architect should review the definition of substantial performance in the appropriate lien legislation.

The Ontario Association of Architects has prepared detailed Practice Bulletins providing advice on the release of holdback monies for subcontracts which are certified as complete, such as those for excavation and foundation subcontracts, to allow for the early or progressive release of holdback.

Some provinces require the certificate to be on a form prescribed by the legislation. The contractor may also be required to arrange for the certificate to be published in a construction trade newspaper. The architect should request proof of the publication date. The publication serves as formal notification to all sub-contractors and suppliers who have the right to place a lien on the project that the period for making a lien claim will expire within a certain number of days, as defined in the provincial or territorial lien legislation, from the date of publication.

The warranty period for the project commences on the date of certification of substantial performance of the total contract.

It is possible to waive the Certificate of Substantial Performance and to proceed directly to a statement of total completion (as defined in the lien legislation). In this case, the warranty period commences on the date of total completion. This is often used on small projects when the time period between substantial performance and total completion is short.

Certification of Release of Holdback

The architect prepares a certificate authorizing payment of the amount of holdback which has accrued to the date of substantial performance. The certificate should be dated for payment one day after the termination of the lien claim period. When issuing the release of the holdback certificate, the architect should advise the owner to ensure that no liens have been registered or notices of liens have been received. Typically, the owner will instruct his or her lawyer to undertake this determination. The architect should **not** perform this legal service; however, the architect should notify the owner that, if no liens exist, the holdback is payable on the date of the certificate.

The terms of CCDC 2 require the owner to place the holdback amount in a bank account (if a separate holdback account has not already been established), in the joint names of the owner and the contractor, ten days before the expiry of the holdback period. In some provinces, such as British Columbia, the lien legislation requires that the holdback monies be paid into a holdback trust account with each and every progress payment to the contractor.

The holdback monies are a trust fund; this fund is **not** intended to enforce the performance of the contractor nor to ensure that deficiencies are corrected. **Certification of payment for known deficiencies should never be made until the performance of the work is acceptable.**

Final Certificate for Payment

Once the architect is satisfied that **all** deficiencies have been corrected and that all work under the contract has been completed, the contractor can apply for payment for the outstanding amount. The final completion or correction of deficiencies can be frustrating for the architect for the following reasons:

- progress towards final completion of outstanding deficiencies seems to be very slow;
- the architect's authority to certify payments and thus influence the contractor to work expeditiously decreases once the major part of the holdback has been released;
- many contractors tend to lose interest in the project when there is no longer a significant financial incentive for its completion, particularly when the outstanding work is the responsibility of sub-contractors.

The architect then prepares and issues the final Certificate for Payment. The date on this

certificate will usually be the date of *deemed completion* of the contract, but, in some circumstances, the deemed date of completion may be an earlier date. In either case, the certificate should specifically confirm the deemed date of completion as stated in the statement of completion.

The definition of *completed*, in some provincial lien acts, permits a small dollar value to remain outstanding. This outstanding amount is the cost of:

- actual total completion;
- correction of known defects;
- last supply of services or materials.

The architect also prepares a certificate for the release of the remaining holdback monies on this final amount, based on the number of days defined in the lien legislation after the date on which the contract is deemed to be complete.

If the contractor is efficient in correcting all the deficiencies, the date of this certificate may precede the date for release of final holdback.

OAA/OGCA Take-Over Procedures, Document 100, is an excellent reference, which graphically explains and charts the take-over procedures and the transferring of the project from the contractor to the owner. It is written in the context of CCDC 2 and the amended *Construction Lien Act, 1990, as amended 2006,* of Ontario.

Letters of Assurance

In some jurisdictions, Authorities Having Jurisdiction require a Letter of Assurance from the architect or registered professional that building has been constructed in substantial compliance with the building code, applicable regulations, and the construction documents accepted for building permit purposes. The Letter of Assurance may be required before an Occupancy Permit is issued.

Final Submissions

Prior to occupancy of the building by the owner, the contractor forwards various items and documentation to the architect for review. These may include:

- operations instructions and maintenance manuals;
- a complete set of keys;
- record documents, which may include shop drawings;
- maintenance materials and spare parts;
- warranties;
- certification of the operation of various systems, such as:
  - fire alarm;
  - sprinkler system;
  - HVAC systems;
  - security system;
  - boiler plant.

The architect and the engineers usually scrutinize these items carefully, because they may be inaccurate or incomplete on first submission and require re-submission before they are acceptable. If the submission process is left to the last minute, the unacceptability of the documentation can delay the completion of training sessions and performance testing. It is good policy to notify the contractor of the amount of the contract that cannot be certified until submissions are satisfactory.

The final submission may be in two stages:

- Stage 1: those items required for the proper operation of the premises for occupancy and, therefore, for certification of substantial performance;
- Stage 2: those items necessary to complete the contract.

In addition to final submissions, it is typical to arrange for a demonstration of all building systems with the following present:

- the owner or owner's designated representative;
- the owner's maintenance personnel;
- the design professionals;
- the sub-contractors or trades responsible for the systems;
- the Authorities Having Jurisdiction (for certain systems only, such as testing of fire alarm systems).

Occupancy

Building occupancy typically occurs as a result of one of three situations:

"Unconditional" Occupancy
Unconditional Occupancy occurs when the scope

of work associated with a building permit and building code compliance is complete and accepted. The Authority Having Jurisdiction formally issues an Occupancy Permit, or Occupancy Certificate, or simply a Notice of Final Inspection.

Conditional Occupancy
Conditional Occupancy occurs when a building, or portion thereof, maybe considered safe but is incomplete with respect to the scope of work shown on the construction documents submitted for the building permit, or with respect to the permit conditions or substantial building code compliance.

Phased (or Partial) Occupancy
Phased (or Partial) Occupancy occurs when a discrete, or stand-alone, portion of a building is complete with respect to the scope of work shown (for that portion) on the construction documents submitted for the building permit, or with respect to the permit conditions or substantial building code compliance.

In all situations noted above, the final issuance of an Occupancy Permit (or local equivalent) or the authorization of a conditional or phased (or partial) occupancy is the role of the Authority Having Jurisdiction. It is advisable to check with the provincial or territorial association of architects for advice on documentation to support conditional and phased occupancy. Normally additional services are required and fees are justified for phased occupancies.

Commissioning

Commissioning includes a range of activities undertaken to transform the design of a facility into a fully integrated and operating system. It is a process of quality assurance which:

- begins with the definition of the "design intent" and ends with the delivery of a building;
- confirms the contractor's implementation of the architect's design as defined in the contract documents;
- confirms the ability of the architect's design to satisfy the client's defined requirements;
- addresses any shortcomings.

One product of the commissioning process may be an accurate project database.
A new guideline, Guideline 0-2005, *The Commissioning Process*, from the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) describes how to verify that a facility and its systems meet the owner's project requirements.

For large and complex projects, the owner may engage a commissioning agent as an independent third party to verify that both the facility design and the resulting construction satisfy the client's objectives and requirements. In addition, the commissioning agent verifies the contractor's performance of the contract. Early involvement of a commissioning agent as a project team member can assist in clear communication of the design intent to both the architect and the contractor.

The commissioning agent can:

- provide useful and objective input to the problem-solving process;
- oversee and verify results by conducting tests.

Commissioning and the services of a commissioning agent are over and above the architect's normal fee.

Pre-occupancy Services

Commissioning may begin at the pre-design stage of a project with an interpretation of the client's expectations in the functional program. Refer to Chapter 2.3.4, *Pre-design*, for information on functional programs.

The client's expectations are documented, working from the general to the specific, in order to develop a logic diagram. The design intent identifies paths of activity necessary to accomplish stated goals. The logic diagram and the functional program should be reviewed regularly during the project's design stages and construction. The architect's responsibility is to communicate the design intent to the building constructor and, ultimately, to the building operator. Commissioning is a quality assurance tool to achieve this.

Because the contractor is usually a late arrival to the project team, an explanation of the verification and testing procedures by the commissioning agent should appear in the bid documents. This will assist bidders in evaluating the time and cost implications of a commissioning agent's participation and the agent's impact upon acceptance of the work.

Bid documents prepared with input from the commissioning agent should include:

- the commissioning plan, including the scope and sequence of the commissioning program;
- the commissioning specifications, including a manual with examples of verification forms and testing procedures, noting probable duration;
- any specialized documentation related to testing, such as CSA Standards, which may describe options for testing methods;
- standards for submission and acceptance of:
  - shop drawings;
  - contractor's tests;
  - product, system, operations, and maintenance manuals;
  - training programs;
  - post-occupancy or seasonal testing;
- the consequences of non-compliance.

Component Verification

The use of performance specifications often results in the supply of components with service characteristics or operational outputs which require minor revisions to the design. The component verification process is an excellent tool to highlight these variances. The commissioning agent should prepare checklists for the verification of each construction element to be tracked, using the risk management assessment classifications — such as *fundamental, critical,* and *essential* — to record compliance with the specifications. In the case of material substitutions, variances from the specifications must include a written statement of recommendation for acceptance by the architect and the acceptance by the owner. Shop drawings and mock-ups are documented, as are the results of tests and the receipt of manuals and warranties.

Systems Verification

The process of systems verification begins after all components within the system are accepted and deficiencies are corrected. The architect and the engineers normally agree upon contract values for items in the verification program so that the contractor is aware of the potential financial impact on progress billing applications and subsequent Certificates for Payment. The contractor's schedule for the timing, sequencing, and proving of systems will require regular commissioning meetings to ensure that all parties are available to:

- verify that all prerequisites to testing are in place;
- review test procedures and acceptable results;
- witness tests.

Attendance at testing procedures by the independent commissioning agent and by the future building operator is beneficial.

Systems verification procedures may require:

- extra time due to the demonstrations of various controls;
- specialized equipment, such as:
  - pressure testing;
  - thermal-scanning of the building envelope.

The timing and circumstances of verification and testing are often beyond the contractor's control, as happens when testing for part of the HVAC systems must be done in a different season.

Failure to verify can seriously affect the construction schedule and can result in delays and claims. To avoid delays:

- have the trades responsible prove or test systems prior to witnessing by the commissioning agent;
- provide for trade and sub-trade acceptance on verification forms prior to contractor acceptance.

After sign-off by the contractor, the consultants will then certify their recommendation of acceptance using standard verification sheets. Variances from the design identified during systems testing will require investigation and reporting by the architect and the engineers. Testing after occupancy can release the contractor from continuous attendance on the site.

Because many integrated systems tests require that certain post-occupancy conditions be in place (for example, all equipment, furnishings, and building users in operation), the architect and the commissioning agent should consider preliminary or conditional testing and recommended acceptance of certain sub-systems. If alteration to the design is required, it must be carefully documented and the project data base altered to suit.

A recommendation by the architect or the engineer to deny acceptance of a system may result in a dispute by the contractor over the design. For this reason, the architect should always provide a method of dispute resolution in the contract.

Once conditional acceptance is established, a building operator training program can be started. Before beginning a training program, the owner's building operator must have:

- complete and accurate operating and maintenance manuals;
- a description of the systems' intended operation;
- the warranties and information outlining maintenance contracts.

Warranty Review

The architect will be responsible for reviewing defects and deficiencies during the warranty period on behalf of the client and for notifying the contractor of items requiring attention. Prior to the anniversary date of the one-year warranty, the architect should arrange a review of the project. The review should include:

- the architect;
- the engineers;
- the client, and probably the client's operations and maintenance personnel;
- the contractor;
- the commissioning agent (if there is one on the project).

After a review of each situation, the architect:

- directs the contractor to correct the problem as required under a typical construction contract; or
- advises the client to deal with the condition, because it is a maintenance problem.

A summary of problems and construction deficiencies should be compiled. The architect verifies the accuracy of the list and forwards it to the contractor, before the contractor's obligations under the contract expire.

If the contractor fails to rectify a warranty item in a reasonable time, the architect may review the client's rights under the bonding and insurance provisions in the contract.

The architect may conduct periodic reviews of the project following occupancy to confirm with the client or the client's personnel that all systems are operating. These reviews determine how well the client's personnel understand the operations manuals and any programmed default settings within the systems. The architect should also advise the client that alterations to any work by the client's own forces during the warranty period may void portions of the contractor's obligation under the contract.

During the first year of operation, it is usually necessary to confirm the performance of mechanical or electrical systems which are used primarily during a certain season of the year. The architect must arrange for such inspection and verification with the engineers (and possibly with the commissioning agent). The contractor must demonstrate that these systems, which were conditionally accepted at the time of substantial performance, satisfy all design requirements before the architect can recommend final acceptance. The architect must document any adjustment or revision to these systems as well as modify the project database and the owner's appropriate operating and maintenance manuals.

The architect and the contractor may be called upon to account for deficiencies uncovered during post-occupancy, either as a result of defective workmanship or the original design.

Post-occupancy Evaluations

Post-occupancy evaluations:

- review a building's performance;
- assess how well the building matches users' needs; and
- identify ways to improve building design, performance and fitness for purpose.

These evaluations, which are an additional service beyond the architect's normal services, may review:

- functional performance, including:
  - social and behavioural review;
  - efficiency of spatial arrangements;
- technical performance such as the performance of building envelope or finishes.

When evaluating functional performance, the architect attempts to quantify and measure performance in terms of explicitly stated needs of occupants and users. Occupational therapists and social scientists have developed useful information in this field. However, many architects who are experienced programmers may also be qualified to provide valuable feedback on user needs. In many cases, these needs would have been defined in the original functional program for the project. Refer to Chapter 2.3.4, *Pre-design*.

Post-occupancy evaluations, which may include a technical review of the building and certain architectural components such as finishes or the building envelope, are used to develop a long-term maintenance plan or the requirements for future projects.

Post-occupancy evaluations assist clients — especially those who undertake many repeat buildings, such as retail outlets and fast-food restaurants — to determine how their future facilities may be improved and how costs may be reduced. Post-occupancy evaluations also assist in improving ergonomics and in developing new functional programs and plans for facility management, future renovations, and master plans.

Finally, the post-occupancy evaluations may review the method of project delivery and contractual arrangements to determine how to improve the design, contract documents, and project management methods for future projects.

Definitions

Certificate: A document attesting to the truth of a fact; in construction, a certificate is prepared by a professional, either an architect or an engineer.

Certificate of Substantial Performance: A certificate issued under the appropriate lien legislation attesting that the contract between the owner and the contractor is substantially complete.

Guarantee: A three-party agreement in which the third party (such as a surety) guarantees the performance of an obligation to the second party (such as an owner) in the event of default of the first party (such as a contractor). (adapted from CCDC)

Holdback: A percentage of the monetary amount payable under a (construction) contract, which is held as security for a certain period of time. The percentage and period of time are based on the provincial lien legislation.

Lien: A legal claim on real property to satisfy a debt owed to the lien claimant by the property owner. This claim can carry the right to sell the property upon default.

Maintenance: The act of keeping a building system, process or property in proper and efficient working condition.

Post-occupancy Evaluation: An assessment of the performance of a building after the building has been occupied. The evaluation may address one or more different aspects of building performance.

Warranty: A two-party agreement which provides an assurance by a builder or a seller of goods (such as a contractor, sub-contractor, or supplier), to a purchaser (such as an owner), that the warrantor will assume stipulated responsibilities for correction of defects in the goods within a stated period of time. (adapted from CCDC)

References

AABC Commissioning Group, *ACG Commissioning Guideline for Building Owners, Design Professionals and commissioning Service Providers*, 2005.
www.commissioning.org

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Guideline 0-2005, *The Commissioning Process*.

Canadian Construction Documents Committee. Ottawa, Ont.
Construction Warranties (bulletin), November 1998.
Warranty vs. Guaranty (bulletin), November 1998.

Cooper, Barbara A.; S. Ahrentzen; and B. Hasselkus. "Post-occupancy Evaluation: an environment-behaviour technique for assessing the built environment." *Canadian Journal of Occupational Therapy*, 1991. (This publication contains a lengthy reference list.)

Ontario Association of Architects (OAA) and Ontario General Contractors Association (OGCA). OAA/OGCA *Take-Over Procedures*, Document 100. Toronto, Ont.: OAA/OGCA.

Web Links to Provincial and Territorial Lien Legislation

British Columbia
Builders Lien Act, S.B.C. 1997, c.45 as amended
www.bclaws.ca/Recon documentfreeside/--%20b%20--/builders%20lien%20act%20%20sbc%201997%20%20c.%2045/00_97045_01.xml

Alberta
Builders Lien Act, R.S.A. 2000, c. B-7
www.qp.gov.ab.ca/documents/Acts/B07.cfm?frm_isbn=0779726944

Saskatchewan
Builders Lien Act, Chapter B-7.1 S.S., 1984-85-86 as amended
www.qp.gov.sk.ca/documents/English/Statutes/Statutes/B7-1.pdf

Manitoba
The Builders' Liens Act, C.C.S.M. c. B91 as amended
web2.gov.mb.ca/laws/statutes/ccsm/b091e.php

Ontario
Construction Lien Act, R.S.O. 1990, c. C30 as amended
www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90c30_e.htm

Quebec
Civil Code, articles 2724-2732, 2952
www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=2&file=/CCQ/CCQ_A.html

New Brunswick
Mechanics Lien Act, R.S.N.B. 1973, c. M-6 as amended
www.gnb.ca/0062/acts/acts/m-06.htm

Nova Scotia
Builders' Lien Act, R.S.N.S. 1989, c. 277 as amended
www.gov.ns.ca/legislature/legc/statutes/bldersln.htm

Prince Edward Island
Mechanics' Lien Act, R.S.P.E.I. 1988, c. M-4
www.gov.pe.ca/law/statutes/pdf/m-04.pdf

Newfoundland and Labrador
An Act respecting the Liens of Mechanics and Others, R.S.N. 1990, c. M-3
www.assembly.nl.ca/legislation/sr/annualstatutes/RSN1990/M03.c90.htm

Northwest Territories
Mechanics Lien Act, R.S.N.W.T. 1988, c.M-7
www.justice.gov.nt.ca/PDF/ACTS/Mech_Lien.pdf

Appendix A - Letter to Client at Project Completion

The final letter from the architect to the client upon completion of a building project is an opportunity for the architect to review the functional programming and performance objectives that were discussed and agreed to early in the project development. The letter should also inform the client about some more practical matters.

The recommended contents of the letter include:

1. Summary of Design Principles

This includes a summary of the principles which governed the design of the building and its mechanical and electrical systems, particularly in relation to energy efficiency and sustainability. This will not only assist the client in understanding how the new building is designed to function, but will be a guide to establishing and managing operating procedures for sophisticated automated building control systems.

2. Maintenance Manuals

This is a reference to the Maintenance Manuals that were forwarded to the client earlier and which contain essential and valuable information on the materials and systems in the building. The client should be encouraged to use these manuals routinely as the first source for information on the operation and maintenance of the building.

3. Maintenance Checklist

A Maintenance Checklist is a guide to the client in establishing normal/routine maintenance procedures for the building (sometimes referred to as "Planned Maintenance").

Refer to the Checklist CH-51 at end of Chapter 2.3.12.

4. Checklist – Replacement of Building Components

This checklist should identify major building components (which have shorter life expectancies than the anticipated occupancy period) and which will require the client to plan and budget for their upgrading and/or replacement at various intervals before the end of the building's useful life (sometimes referred to as Capital Asset Management).

Refer to the Checklist CH-52 at end of Chapter 2.3.12.

*[Note: The two Checklists mentioned above are for the architect's use as a **guide only** in preparing project-specific information, which should be enclosed with the letter to the client.]*

5. Services during the Construction Contract Warranty Period

This refers to a description of the architect's services to be provided during the warranty period for the construction contract, which include:

- review of defects and deficiencies;
- notification of the contractor of defects and deficiencies as they are identified;
- follow-up with the contractor; and
- inspection and reporting at the end of the warranty period.

6. Other

This might include any other relevant information the architect may wish to add including comments of the architect's choosing, appropriate to the relationship with the client and the prospect of future commissions. In addition, the architect may offer to carry out post-occupancy evaluation services, for additional fees to be negotiated.

References

International Facilities Management Association. Asset Lifecycle Model for Total Cost of Ownership Management – Framework, Glossary & Definitions. 2005

Checklist: Maintenance of Architectural Components

General Notes

This Checklist is intended as a general guide for use by the building owner/facilities manager for routine inspections, repairs or touch-up at the intervals noted. It does **not** address every specific item relevant to every building type nor does it address cleaning and typical janitorial tasks. Maintenance Manuals provided to the owner by the general contractor upon completion of the project will contain more detailed information and should be referred to by the owner/facilities manager on a regular basis.

This Checklist deals primarily with architectural items; therefore, the architect should consider augmenting the consulting engineers' scope of work by adding the preparation of similar, more detailed, lists for structural, mechanical and electrical items requiring routine inspections.

Comments, clarifications or recommendations are in *italics*.

Use of a forward slash (/) in the Checklist signifies *and* or *or*

Frequently (maximum interval: monthly):

Windows/Entrances:
- ❑ operating entrance hardware; *adjust or replace as required:*
  - ❑ locks/lock sets;
  - ❑ closers;
  - ❑ automatic openers;
  - ❑ access systems;
- ❑ loose/detached thresholds; *adjust or replace as required.*

Interior Doors:
- ❑ operating hardware; *adjust or replace as required:*
  - ❑ locks/lock sets;
  - ❑ closers;
  - ❑ automatic openers;
  - ❑ electro-magnetic hold-opens.

Accessories:
- ❑ loose corner guards/wall bumpers/grab-rails; *adjust or replace as required:*
- ❑ toilet compartments; *adjust or replace as required:*
  - ❑ door hardware;
  - ❑ support brackets/anchors.

Twice Per Year (spring and fall):

Roofing/Flashings:
- ❑ remove accumulated debris from:
  - ❑ perimeter of roof;
  - ❑ drains/gutters/downspouts;
- ❑ observe general condition, paying particular attention to:
  - ❑ surfaces/seams/roof drains;
  - ❑ perimeter conditions: cants/curbs/ridges/valleys.

Skylights:
- ❑ broken or damaged glass;
- ❑ transparency loss in double/triple glazing;
- ❑ physical damage to frames;
- ❑ failed anodizing/painted coatings;
- ❑ evidence of leakage;
- ❑ glass to frame sealants;
- ❑ perimeter caulking.

Room Dividers/Folding Walls:
- ❑ operation:
  - ❑ tracks;
  - ❑ trolleys;
  - ❑ electrical components;
- ❑ sound seals:
  - ❑ between panels;
  - ❑ top;
  - ❑ operable floor seals;
- ❑ latching/locking;
- ❑ panel skins:
  - ❑ adhesion;
  - ❑ wear/soiling/physical damage.

Mechanical Systems *partial list*:
Follow manufacturers' recommendations for routine inspection and maintenance schedules found in Maintenance Manuals provided by Mechanical Contractor upon project completion. *(Note: The customized list should include items such as air and water filter replacement, maintenance of HVAC, chillers, boilers, plumbing, extinguishing systems, back flow prevention systems, refrigeration and pumps, etc.)*

Electrical Systems *partial list*:
Follow manufacturers' recommendations for routine inspection and maintenance schedules found in Maintenance Manuals provided by Electrical Contractor upon project completion. *(Note: The customized list should include cleaning and replacement of lighting reflectors/lenses/ other lighting surfaces and exit signs; vacuum service entrance board/interior of all panel boards; primary and secondary systems, emergency electrical systems, UPS, master clocks, fire/life safety systems and alarms, remote monitoring, elevator maintenance, etc.)*

Every Year:

Grounds (including roadways, sidewalks, pavers, catch basins, storm sewers, landscaping, etc.)

Exterior and Interior Signage

Below-Grade Concrete or Masonry Walls:
- ❑ indications of stress/settlement:
  - ❑ cracks/shearing;
  - ❑ water leakage;
- ❑ efflorescence/spalling on interior surfaces *in occupied/unoccupied spaces*.

Exterior Wood (painted/natural finish):
- ❑ coatings (flaking, chipping, chalking, weathering);
- ❑ fungal decay/insect infestation;
- ❑ vegetation *too close*;
- ❑ evidence of decay in beam ends/outriggers.

Exterior Masonry:
- ❑ cracked/disintegrating mortar joints;
- ❑ loose bricks/blocks;
- ❑ plugged weeping holes and slots;
- ❑ indications of stress/settlement:
  - ❑ cracks/shearing of masonry units;
- ❑ copings:
  - ❑ loose units/open joints/settlement/loose flashing;
  - ❑ efflorescence/heavy soiling/graffiti requiring removal;
  - ❑ staining by run-off from copings/flashings/ window sills;
  - ❑ caulking, including caulking of expansion joints.

Exterior Exposed Concrete:
- ❑ staining indicating corrosion of reinforcing steel/exposed form tie ends;
- ❑ spalling/cracking/undue wear, where applicable (e.g. stairs).

Exterior Metal (exposed steel/iron, structural/ ornamental):
- ❑ painted/galvanized surfaces, paying particular attention to:
  - ❑ corrosion of anchors/base plates/ends of members abutting dissimilar materials;
  - ❑ exposure to accumulated organic matter standing water on horizontal surfaces.

Exterior Finishes:
- ❑ pre-painted/galvanized steel siding/panels:
  - ❑ edges; *for indications of corrosion due to coating loss;*
  - ❑ condition of surfaces (chalking/crazing/ erosion);
  - ❑ caulking at lap joints;
- ❑ cracking/crazing/staining/mould growth and telegraphing of support system framing of synthetic stucco finishes (EIFS).

Windows/Entrances:
broken or damaged glass;
- ❑ transparency loss in double/triple glazing;
- ❑ physical damage to frames;
- ❑ failed anodizing/painted coatings;
- ❑ glass to frame sealants;
- ❑ perimeter caulking.

Interior Doors and Frames:
- ❑ hollow metal:
  - ❑ condition of painted/galvanized surfaces;
  - ❑ physical damage;
  - ❑ perimeter caulking of frames;
- ❑ veneer/plastic laminate faced wood doors:
  - ❑ delamination of veneers/plastic laminates;
  - ❑ damaged edges/corners;
  - ❑ fading/staining/soiling;
- ❑ vision panels/glazing:
  - ❑ broken or damaged glass;
  - ❑ glass to frame sealants.

Stairs/Handrails/Guards:
- ❑ excessive wear on nosings/treads/landings;
- ❑ rigidity/stability of guards;
- ❑ anchorage/stability of handrails;
- ❑ condition of painted/galvanized surfaces.

Interior Finishes:
- ❑ flooring/bases:
  - ❑ excessive wear in high traffic areas:
    - ❑ top/bottom of stair flights;
    - ❑ corridor corners;
    - ❑ doorways/entrances;
  - ❑ ceramic/precast terrazzo tile:
    - ❑ cracking/crazing;
    - ❑ grout (loss/staining);
    - ❑ loose/damaged base units;
  - ❑ resilient sheet/tile flooring:
    - ❑ curling/lifting/loss of adhesion;
    - ❑ splitting/separation of seams;
    - ❑ adhesion of bases integral with sheet flooring;
  - ❑ carpet/carpet tile:
    - ❑ excessive wear;
    - ❑ pile damage/seam zippering;
    - ❑ curling/lifting/loss of adhesion;
  - ❑ poured seamless flooring:
    - ❑ cracking/loss of integrity;
    - ❑ physical damage.
  - ❑ rubber or vinyl bases:
    - ❑ loss of adhesion;
    - ❑ shrinkage;
- ❑ wall/ceiling finishes:
  - ❑ painted surfaces:
    - ❑ fading/staining/soiling;
    - ❑ drywall (cracks/nail pops);
  - ❑ natural finished surfaces:
    - ❑ wear/crazing/cracking/soiling;
  - ❑ ceramic tile:
    - ❑ cracking/crazing;
    - ❑ grout (loss/staining/mould);
    - ❑ perimeter/corner caulking;
  - ❑ wallpaper/vinyl wall fabric:
    - ❑ fading/staining/soiling;
    - ❑ curling/lifting/loss of adhesion;
  - ❑ ceiling or wall staining, *indicating possible leakage from concealed piping or roofs.*

Cabinetwork/Built-in Furniture/Custom Millwork/ Wall Paneling/etc:
- ❑ delamination of veneers/plastic laminates;
- ❑ damaged edges/corners;
- ❑ fading/staining/soiling;
- ❑ operating hardware:
  - ❑ hinges;
  - ❑ locks/latches;
  - ❑ sliding/folding/tambour doors.

Structural Systems:
- ❑ cracking/deformation caused by settlement or overloading.

Mechanical Systems *(partial list)*:
Follow manufacturers' recommendations for routine inspection and maintenance schedules found in Maintenance Manuals provided by Mechanical Contractor upon project completion; *some of these inspection/maintenance activities may be required at more frequent intervals:*
- ❑ systems:
  - ❑ humidification;
  - ❑ water treatment;
  - ❑ sprinkler;
  - ❑ temperature control;
  - ❑ air balance;
  - ❑ automated building control;
- ❑ special equipment: heat recovery units etc.
- ❑ clean:
  - ❑ strainers;
  - ❑ inside of air handling systems/fans/ ducts/coils/terminal units, etc.;
- ❑ valves:
  - ❑ seals;
  - ❑ missing identification tags;
- ❑ lubricate bearings;
- ❑ check for fan noise;
- ❑ straighten bent fins on all coils on finned radiation elements;
- ❑ vibration isolators;
- ❑ physical damage to pipe/duct/equipment insulation;
- ❑ damaged paint or finishes on equipment.

Checklist: Replacement of Building Components

Introduction

Some major components of a new building do not last as long as others. This fact should be addressed during the life-cycle cost analysis that is usually carried out during the pre-design stage. (However, not all projects go through a life cycle cost analysis in the pre-design stage.) Such an analysis is important in making management decisions for the facility once it has been completed and occupied.

The prudent owner will plan and budget for upgrading or replacing these major components over the mid-term or long-term of the building's projected useful life, thus ensuring that adequate funds will be available when major expenditures are needed. Unfortunately, too many institutions owning a large number of aging buildings face huge maintenance or replacement costs for which little or no funding is available within their operating budgets. The following checklist provides a general indication of the building components which the building owner should monitor on a routine basis (refer to the Maintenance Checklist, CH-50 in Chapter 2.3.12). The owner should also budget for and set aside funds for their upgrading or replacement.

The life of these major components is not easily predictable and depends on many factors, including the quality of the product selected, routine maintenance, intensity of use or loading, wear and tear, severity of local weather conditions, and so on. Manufacturers' claims for their products cannot always be relied upon, although when warranties are offered or specified they are likely to indicate the low end of a product's life expectancy. Electronic products are now common in controls for mechanical and electrical systems and although they may not wear out quickly, they are vulnerable to rapid obsolescence.

Under five years:

- ❑ incandescent and fluorescent lamps;
- ❑ weatherstripping.

Five to ten years:

- ❑ illuminated exit signs;
- ❑ electronic systems and equipment.

Ten to twenty years:

- ❑ synthetic stucco finishes (EIFS);
- ❑ sealed double or triple glazing;
- ❑ resilient sheet/tile flooring;
- ❑ roofing;
- ❑ carpet.

Twenty to thirty years:

- ❑ pre-painted steel siding/panels
- ❑ Major mechanical equipment:
  - ❑ boilers
  - ❑ hot water heaters
  - ❑ main supply and exhaust fans
  - ❑ fan coil units
  - ❑ air conditioning chillers
  - ❑ heat exchangers
  - ❑ heat recovery units
  - ❑ humidifiers
  - ❑ temperature controls/automatic building control system
- ❑ Major electrical equipment:
  - ❑ transformers

2.4 Standard Forms for the Management of the Project

Canadian Handbook of Practice for Architects

Guide to the Use of the Forms

Purpose of the Forms

Other Forms

1. Forms for General Communications

1.1 Memorandum

1.2 Minutes of Meeting

1.3 Transmittal

1.4 Project Team Directory

2. Forms for the Bidding Phase of a Project

2.1 Bid Documents Distribution List

2.2 *Stipulated Price Contract Bid Form*

2.3 Addendum

2.4 *Contractor's Qualification Statement* (refer to CCDC 11)

2.5 *Project Financial Information* (refer to CCDC 12)

2.6 Summary of Bids

2.7 Letter of Acceptance

2.8 Letter to Unsuccessful Bidders

3. Forms for Contract Administration

3.1 Field Review Report

3.2 *Supplemental Instructions* (refer to CCDC 24)

3.3 *Proposed Change* (refer to CCDC 24)

3.4 *Change Order* (refer to CCDC 24)

3.5 *Combined Proposed Change and Change Order* (refer to CCDC 24)

3.6 *Change Directive* (refer to CCDC 24)

3.7 *Summary of Changes* (refer to CCDC 24)

3.8 *Notice* (refer to CCDC 24)

3.9 *Warranty Notice* (refer to CCDC 24)

3.10 *Product Warranty Notice* (refer to CCDC 24)

3.11 Request for Information

4. Forms for Certification

4.1 *Certificate for Payment* (refer to CCDC 24)

4.2 Certificate of Substantial Performance

4.3 *Statutory Declaration Forms* (refer to CCDC 9A, 9B, and 9C)

4.4 *Application for Payment* (refer to CCDC 24)

4.5 *Schedule of Values and Work Performed* (refer to CCDC 24)

4.6 Letters of Assurance

5. Other Forms for Project Management

5.1 Index of Supplemental Instructions

5.2 Drawing Notations

5.3 Shop Drawing Review Notations and Cover Letters

5.4 Log of Shop Drawings and Samples

Note: italics indicate that the Forms are currently available from the Canadian Construction Documents Committee (CCDC); refer to Volume 3 of the Handbook.

Sample Forms for the Management of the Project

Guide to the Use of the Forms

Purpose of the Forms

The forms in this section of the Handbook are provided to assist the architect in managing a project. Standardized forms support effective record-keeping and other functions. As well, many of these forms are needed to fulfil contractual requirements.

The Handbook does NOT duplicate forms which are available from the Canadian Construction Documents Committee (CCDC), such as those in CCDC 24, *A Guide to Model Forms and Support Documents (for use with CCDC 2)*.

Other Forms

This section of the Handbook provides only the basic forms used to manage most architectural projects. Other forms which may be required include:

- **Survey Requirements** (to be provided to land surveyors)
- **Index of Drawings/Sketches**
- **Index of Drawing Revisions**
- **Index of Sub-contractors**
- **Index of Minutes of Meetings**
- **Index of Field Review Reports**
- **Record of Committed Funds** (to track expenditures from a contingency fund)

1. Forms for General Communications

1.1 Memorandum

A memorandum, or memo, is used as a note when a letter or more formal correspondence is not appropriate. When distributed outside the architectural practice, the memo is usually initialed or signed at the bottom of the message or next to the name of the sender. The text should be clear, concise, and correct.

Purpose
A memorandum is used to:

- transfer, confirm, record, and file miscellaneous information both within and outside the office;
- act as a reminder of outstanding business or action required.

Contents
The memo contains the following information:

- recipient;
- sender;
- date;
- file or project name and number;
- title of the subject matter;
- body of text or information.

1.2 Minutes of Meeting

Minutes of Meetings are used to document meetings, including telephone calls or telephone conferences. This form is sometimes called a Meeting Report or Conference Report.

Purpose
The Minutes are a record of items discussed or agreed upon at meetings. This report should include the purpose of the meeting, a list of attendees, and an action column indicating the name of the individual or firm responsible for follow-up.

Contents
The Minutes may provide the following headings:

- project name and number;
- date;
- location;
- purpose of meeting;
- list of attendees;
- record of decisions;
- action(s) required.

1.3 Transmittal

A transmittal is a convenient form which records the routing of drawings, specifications, sketches, shop drawings, samples, product literature, and other documents which are transmitted electronically or by other means.

Purpose
The transmittal is used to:

- record and document the information transmitted;
- record the date of transmission;
- indicate the action expected upon receipt of the information;
- direct the routing and mode of delivery.

Contents
Transmittals contains the following:

- date;
- addressee or recipient;
- project name and number;
- method of transmittal;
- action required;
- itemized list of documents or information;
- remarks or additional notes pertaining to the information;
- names of recipients also receiving same items or information.

1.4 Project Team Directory

This is a complete list of the representatives of the various organizations involved in a project and their contact information.

Purpose
The directory provides a simple, accessible source of contact information for communication purposes.

Contents
The directory should include:

- name of firm or organization;
- name of individual;
- role and/or title of individual;
- address;
- telephone and fax number (usually business telephone, but sometimes emergency or home telephone numbers are important);
- cellular telephone number;
- E-mail address.

2. Forms for the Bidding Phase of a Project

For a general discussion of this phase of a project and for the application and use of these forms, refer also to Chapter 2.3.9, *Construction Procurement*.

2.1 Bid Documents Distribution List

It is important to track the distribution of documents when a project is "out for tender."

Purpose
The list is used to:

- identify all bidders and other recipients;
- record deposits for documents;
- provide a distribution list for addenda;
- provide a checklist to secure the return of documents after bid closing.

Contents
The Bid Documents Distribution List should include the following information:

- project name and number;
- bid closing time and date;
- name, address, E-mail and telephone and fax numbers of all contractors (bidders and other recipients);
- number of sets of documents received;
- date of issue and date of return of sets of documents;
- deposits received and returned;
- number of addenda issued and date of issue.

2.2 Stipulated Price Contract Bid Form

Refer to Chapter 2.3.9, *Construction Procurement,* and to CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts,* for information on developing a bid form.

2.3 Addendum

All addenda must be carefully worded and distributed, as they will form part of the construction contract. Addenda may contain revised or additional drawings. They must be distributed to all bidders and others at the same time, in the same manner, and no later than four days prior to bid closing.

Refer to Chapter 2.3.9, *Construction Procurement,* and to CCDC 23, *A Guide to Calling Bids and Awarding Construction Contracts,* for more information on addenda.

Purpose
Addenda are used to:

- provide additional information to be included in the bid documents;
- correct or clarify information in the bid documents;
- identify changes in the instructions to bidders (closing date, time, etc.).

Content
The addendum should include the following information:

- project name and number;
- number and date of the addendum;
- a reference to the appropriate bid document (drawing, specification, instructions to bidders, etc.);
- a detailed description of the new information.

2.4 Contractor's Qualification Statement

Refer to *CCDC Document 11* for a sample form.

Refer to Chapter 2.3.9, *Construction Procurement,* and to CCDC 24, *A Guide to Model Forms and Support Documents,* for information on the use and application of this form.

2.5 Project Financial Information

Refer to CCDC 12, *Project Financial Information,* for a sample form.

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for information on the use and application of this form.

2.6 Summary of Bids

This form is both a record of bids and a tool for analyzing them.

Purpose
The summary of bids:

- provides a list for easy comparison and analysis;
- identifies bids which are non-compliant ;
- is useful as a preliminary record during opening of bids.

Contents
The form must contain the following:

- project name and number;
- bid closing time and date;
- list of contractors submitting bids;
- list of bid amounts;
- list of acceptable bid securities (bid bond, certified cheque, etc.);
- identification of non-compliant bids;
- list of alternatives or proposed substitutions;
- project completion time (if requested in bid documents).

2.7 Letter of Acceptance

Refer to Chapter 2.3.9, *Construction Procurement,* for information on the proper use of this letter. A Letter of Acceptance is normally issued by the client or owner; however, the architect may assist in its preparation.

Purpose
The Letter of Acceptance:

- notifies a successful bidder of the award of contract;
- permits work to start immediately pending the preparation and execution of a formal contract.

Contents
The Letter of Acceptance may include:

- date;
- name and address of successful bidder (contractor);
- project name and number;
- date and amount of the bid;
- directions regarding commencement of the work;
- acceptance of alternatives;
- confirmation of the contract price;
- starting date of commencement of contract.

2.8 Letter to Unsuccessful Bidders

It is both professional and courteous to inform unsuccessful bidders in a timely manner of the award of a contract. The letter can be sent by the architect or the owner.

Purpose
The purpose of this Letter to Unsuccessful Bidders is to:

- notify all bidders of the status of the project;
- permit bidders to make necessary arrangements for bonding and bidding other projects;
- inform bidders of the actual amount of the successful contract.

Contents
The Letter to Unsuccessful Bidders may contain the following information:

- date;
- the name of the successful contractor;
- the contract amount with a brief explanation if this is different from the low bid (acceptance of alternatives, etc.);
- description of the method for returning bid documents and obtaining deposits on these documents;
- indication of the method for return of bid bonds or bid security, if necessary;
- a note of thanks for bidding on the project.

3. Forms for Contract Administration

3.1 Field Review Report

Field Review Reports form a log of observations and actions taken during the construction and post-construction stages of a project. These reports are often supplemented by audio recordings and photographic or video records.

Refer to Chapter 2.3.11, *Contract Administration — Field Functions,* for more information on the preparation of Field Review Reports.

Purpose
Field Review Reports are used to:

- record construction activities summarizing the status of the project at regular intervals
- communicate with and report to the client, authorities, and the contractor on the status of a project;
- manage information;
- assist in processing the contractor's applications for payment and the preparation of Certificates for Payment;
- create a project history to assist in providing documentation and findings regarding possible future claims.

Content
All Field Review Reports should contain the following information:

- project name and number;
- location of project;
- number of the Field Review Report;
- date of visit;
- name of general contractor;
- weather conditions;
- general observations, including stage of construction;
- description of work in progress;
- action required;
- name and title of person performing the review;
- names of organizations and representatives who will receive the report;
- list of attachments;
- comment on previous reports' "action required";
- method of transmission.

3.2 Supplemental Instructions

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* of this Handbook, for information on the use of the Supplemental Instruction Form.

3.3 Proposed Change

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* of this Handbook, for information on the use and application of this form.

3.4 Change Order

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* of this Handbook, for information on the use and application of this form.

3.5 Combined Proposed Change and Change Order

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

3.6 Change Directive

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* of this Handbook, for information on the use and application of this form.

3.7 Summary of Changes

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

3.8 Notice

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

3.9 Warranty Notice

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

3.10 Product Warranty Notice

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

4. Forms for Certification

4.1 Certificate for Payment

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* for information on the use and application of this form.

4.2 Certificate of Substantial Performance

The requirement for a Certificate of Substantial Performance and the type of form varies in each province and territory and is based on the relevant construction lien legislation. The architect should confirm which form is suitable in the province or territory in which the project is undertaken. The applicable lien legislation may prescribe the form to be used for the certification of substantial performance.

Refer to Chapter 2.3.12, *Take-over Procedures, Commissioning, and Post-occupancy Evaluations* for additional information on substantial performance.

4.3 Statutory Declaration Forms

Refer to *CCDC 9A, 9B,* and *9C* for sample forms.

Refer to *CCDC 24, A Guide to Model Forms and Support Documents,* for information on the use and application of these forms.

4.4 Application for Payment

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* for information on the use and application of this form.

4.5 Schedule of Values and Work Performed

Refer to CCDC 24, *A Guide to Model Forms and Support Documents,* for the purpose of this form, a guide to its use, and a sample form.

Refer to Chapter 2.3.10, *Contract Administration — Office Functions,* for information on the use and application of this form.

4.6 Letters of Assurance

A Letter of Assurance is a requirement in some jurisdictions including the provinces of British Columbia, Alberta and Nova Scotia. All architects practising in these jurisdictions should refer to the appropriate guides regarding Letters of Assurance in the local building codes and in bulletins from provincial association of architects.

Generally speaking, Letters of Assurance must be signed, sealed, and dated by registered architects who are practising (principals) in architectural firms or who hold Certificates of Practice in designated engineering firms.

Purpose
The Letters of Assurance are used to provide certification to Authorities Having Jurisdiction at two milestones:

- application for building permit;
- intention to occupy the building.

Content
Always use the standard form of the Letter of Assurance Assurance from the appropriate jurisdiction for the place of the work. For example, in British Columbia refer to the latest edition of the *British Columbia Building Code* or the Vancouver Building Bylaw equivalent for sample letters.

5. Other Forms for Project Management

The architect can use many forms to assist in the management of a project.

5.1 Index of Supplemental Instructions

Refer to CCDC 24, *A Guide to Model Forms and Support Documents*, for a typical Supplemental Instruction Form.

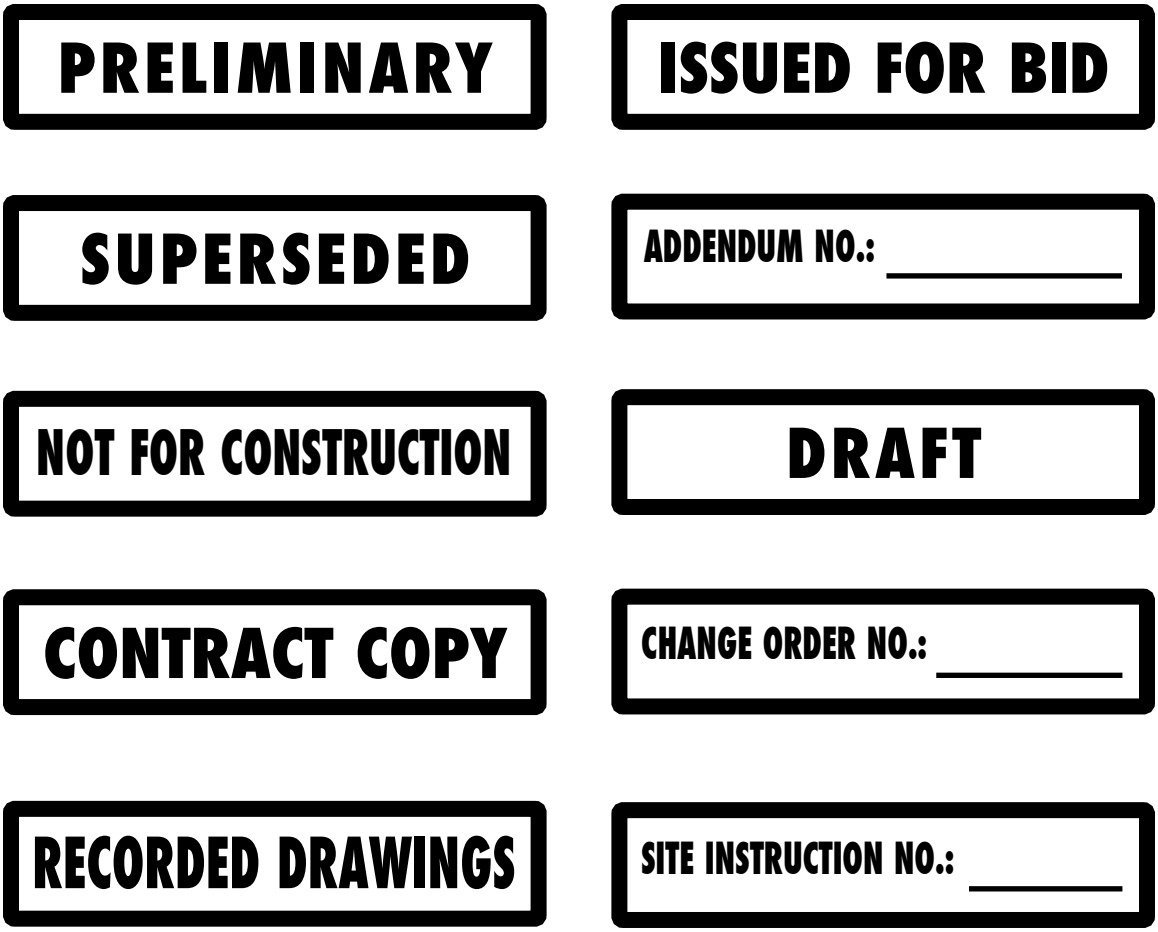
When numerous supplemental instructions are issued to clarify or interpret the contract documents, a reference list is needed to track all instructions issued.

Content
On an Index of Supplemental Instructions, provide the following information:

- project name and number;
- numbers of the Supplemental Instructions (in chronological order);
- descriptive title for each instruction;
- representative who initiated the instruction;
- date of issue of the Supplemental Instruction;
- indication of whether or not a Change Order was required.

5.2 Drawing Notations

The following common notations applied to drawings indicate the stage of development of a design or construction document. In addition, the notation indicates a restriction or clarification for the document's use.



5.3 Shop Drawing Review Letters

The review of shop drawings and the the use of the appropriate cover letter and the application of notations to the shop drawings have significant implications regarding professional liability and legal responsibility. Refer to Chapter 2.3.10, *Contract Administration — Office Functions*, for the use and application of the shop drawing cover letters and notations.

The following wording is suggested for a shop drawing stamp:

Logo or Name of Architectural Practice

Reviewed ( )
Reviewed as noted ( )

Revise and resubmit ( )
Not reviewed ( )

Date:

Reviewed by:

This review is for the sole purpose of ascertaining conformance with the general design. This review does not relieve the Contractor of the responsibility for errors or omissions in the shop drawings or of the responsibility to meet all requirements of the contract documents. The Contractor shall confirm all dimensions and coordinate all construction and the work of all sub-trades.

The following are other possibilities for cover letters:

1. For shop drawings which are not required:

This submission is not required under the contract documents and is being returned with no action taken by the Architect.

2. For shop drawings with engineering content only:

[Note: clarify in the cover letter that shop drawings have **not** *been reviewed by the architect.]*

Date Received:

File or Project No.:

Routing:

Action:

3. For shop drawings to be reviewed only by the architect:

Reviewed ( )
Reviewed as noted ( )

Revise and resubmit ( )
Not reviewed ( )

Date:

Reviewed by:

This review by *[insert name of practice]* is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that *[insert name of practice]* approves the detailed design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of the responsibility for errors or omissions in the shop drawings or of the responsibility for meeting all requirements of the contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the work of all trades.

4. For shop drawings with engineering elements which must also be reviewed by the architect:

Reviewed ( )
Reviewed as noted ( )

Revise and resubmit ( )
Not reviewed ( )

Date:

Reviewed by:

This review by *[insert name of practice]* is for the sole purpose of ascertaining conformance with the general design concept for architectural features only, and does not in any way constitute review of the design of engineering elements which form part of the contract documents prepared by others. This review shall not mean that *[insert name of practice]* approves the detailed design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of the responsibility for errors or omissions in the shop drawings or of the responsibility for meeting all requirements of the contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the work of all trades. Refer also to Form ___, a sample cover letter regarding shop drawing review.

Refer also to Form 3.1c, a sample cover letter regarding shop drawing review.

5.4 Log of Shop Drawings and Samples

It is important to ensure the timely review and tracking of all shop drawings and samples, both within the architect's office and by consultants. This log assists in the efficient management and distribution of shop drawings and samples.

Items within the log of shop drawings and samples may be listed or filed using the MasterFormat™ system. A copy of the log should be filed with the project's shop drawings.

Purpose
The shop drawings and samples log:

- provides a list of all required shop drawings and samples;
- identifies shop drawings and samples required but not yet received;
- determines the status of the review and distribution of shop drawings as well as approval of samples;
- provides a checklist for the preparation and review of a manual during "take-over."

Content
The shop drawings and samples log may contain the following:

- title of the drawing;
- drawing number;
- date of preparation;
- MasterFormat™ number for the product or system;
- company or trade responsible for preparing the drawing;
- date received;
- name of consultant to whom the drawing or sample was referred for review;
- date of referral;
- date that the shop drawing or sample is returned;
- date that the shop drawing is forwarded to the general contractor;
- status of the shop drawing or sample (e.g., reviewed, reviewed as noted, or resubmit).

Logo or Name of Architectural Practice

Memorandum

To: Project Architect
From: Job Captain
Subject: ABC Building Renovation
Mechanical Data

Date: September 5, 2009
File/Project No.: 09101

Mechanical Engineer has advised as follows:

1. Mechanical Order of Magnitude Costs

1.1	Ground floor offices	$6,600
1.2	Boardroom	$6,600
1.3	Second floor offices	$11,500
		$24,700

Note: These costs are exclusive of fees or contingencies.

2. Architectural Requirements for Mechanical

2.1 Roof-top AC ducts (3) require holes in roof, roof curbs and enclosures in vertical duct shafts (about 2'-0" x 2'-0")

2.2 Furred-in enclosure for ducts allow 20" extensions, six spots cut and patch for each unit.

3. Electrical Requirements for Mechanical

3.1 2 1/2 H.P. required for each AC unit noted above.

c. Mechanical Engineer
Electrical Engineer

Method of Transmission: by e-mail only.

Logo or Name of Architectural Practice

Minutes of Meeting No.: 4

Project: ABC Building Renovation

Date: May 18, 2009 **Project No.:** 09101

Location: Site

The following summarizes all subjects discussed and decisions reached at the above-noted meeting. Please advise Architect of any errors or omissions.

4.1 ATTENDEES

Client: U. Lysses
Contractor: O. Lympus
Architect: P. Thagorus, J. Smith

4.2 GENERAL

.1 Contract — Client is to sign contract and return to Architect at earliest convenience (outstanding 2 weeks).

.2 Insurance — Contractor is not prepared to accept $1,000 deductible as noted in his letter to provide same for remainder of project duration by June 1, 2009. Client to review.

.3 Cash Flow — Contractor has provided cash flow projections for first three months and is to provide same for remainder of project duration by June 1, 2009.

.4 Schedule — Copies of garage and tower superstructure bar chart schedules were distributed to Client and Architect for review and comment.

4.3 ARCHITECTURAL

.1 Samples — Travertine sample to be resubmitted.

.2 Hoarding Colour & Sign — Client to advise regarding hoarding colour and $600 allowance for sign.

.3 Documentation — Contractor advised that they had documented the condition of existing landscaped area by photograph and letter, before erecting temporary offices. A copy of this documentation will be submitted to Architect.

Action by

Client
U. Lysses

Client
U. Lysses

Contractor
O. Lympus

Architect
P. Thagorus

Contractor
O. Lympus

Client
U. Lysses

Contractor
O. Lympus

Action by

4.4 STRUCTURAL

.1 Service Tunnels —, Contractor stated that their bid does not include an allowance for tunnels, to connect services. Tunnel work should commence immediately, but the contractor is not prepared to start until this matter is clarified. Architect to review and advise.

Architect
P. Thagorus

.2 Garage Alterations — Existing pipe columns are to be inspected by Structural Engineer and reworked. Instructions required (outstanding 1 week).

Structural Engineer

4.5 MECHANICAL

.1 No pending business.

4.6 ELECTRICAL

.1 Electrical Contract Clarification — Decision on the following is still outstanding and is delaying finalization of prime contract and electrical sub-contract:

- ABC fixtures in lieu XYZ
- Transformer type — dry type vs. oil

Client reported that while they have been fully briefed on this situation, they will not consider the matter further until Contractor replies to the Architect's letter of 10 April 2009.

Contractor
O. Lympus

4.7 STATUS OF SHOP DRAWINGS AND SAMPLES

.1 Contractor and Architect reported no outstanding items at this time.

4.8 STATUS OF CHANGES

.1 Status Proposed Changes issued to date:

PC 1 Incoming service & power supply	Client signing CO
PC 2 Travertine finish — core walls	Architect checking
PC 3 Mechanical revisions	Architect checking
PC 4 Structural foundation revisions	Architect checking
PC 5 Clarification of parking garage structure	Contractor pricing
PC 6 Sprinkler revisions	Contractor pricing

4.9 DISTRIBUTION — U, Lysses
— O, Lympus
— Structural Engineer

Prepared by:
James Smith, Project Architect

Logo or Name of Architectural Practice

Transmittal

Project Name: **Project No.:**

Date:

To:

From:

For your:
- ❑ Approval
- ❑ Distribution
- ❑ Information and use
- ❑ Review and comment

Via:
- ❑ Mail
- ❑ Courier
- ❑ By hand
- ❑ To be picked up
- ❑ Fax
- ❑ E-mail

Quantity: **Description:**

Remarks:

Logo or Name of Architectural Practice

Project Team Directory

Name of Project:

Project No.:

Date Prepared:

Name of Client:

Name of Client's Representative:

Address:

Telephone:

Fax:

Cellular:

E-mail:

DISCIPLINE	Firm NAME	Representative
Architect		
Address		
Telephone		
Fax		
Cellular		
E-mail		
Structural Engineer		
Address		
Telephone		
Fax		
Cellular		
E-mail		
Mechanical Engineer		
Address		
Telephone		
Fax		
Cellular		
E-mail		
Electrical Engineer		
Address		
Telephone		
Fax		
Cellular		
E-mail		
Other Consultants		
Address		
Telephone		
Fax		
Cellular		
E-mail		

Logo or Name of Architectural Practice

Bid Documents Distribution List

Name of Project:

Project No.:

Name of Client:

Bid closing:

Name of Bidder or Recipient	Address/Telephone/Fax	Number of Sets	Deposit Received (include date and amount)	Deposit Returned (include date and amount)	Addenda Issued (include date)				

Form 2.1

Logo or Name of Architectural Practice

Addendum No._____

page _____ of _____

Project No.:

Date:

Project:

The following information supplements and/or supersedes the bid documents issued on _____.

This Addendum forms part of the contract documents and is to be read, interpreted, and coordinated with all other parts. The cost of all contained herein is to be included in the contract sum. The following revisions supersede the information contained in the original drawings and specifications issued for the above-named project to the extent referenced and shall become part thereof. Acknowledge receipt of this Addendum by inserting its number and date on the Tender Form. Failure to do so may subject bidder to disqualification.

Drawings:

Specifications:

Logo or Name of Architectural Practice

Summary of Bids

Name of Project: _____ **Project No.:** _____

Name of Client: _____

Bid Closing: _____

Name of Bidder	Bid Amount	Bid Security (bid bond, certified cheque, etc.)	Agreement to Bond	Informal Bid (specify irregularity)	Proposed Alternatives	Cost Savings or Extras	Proposed Completion Date

Client's logo

Letter to Client reporting on Bids

Project No.

Date:

Name:

Company:

Address:

City: **Postal Code:**

Fax:

Dear Sir or Madam :

Re: **Project Name:**

Project Name continued:

Sealed Tenders for the above work were received from (insert number) interested general contractors at (time) on (day), (date), with the following resulting Base Prices:

1.	$
2.	$
3.	$
4.	$
5.	$
6.	$
7.	$
8.	$

A copy of the (insert name of General Contractor's) tender is attached. They gave (insert number) weeks as a proposed time to have the work "Substantially Performed". Their sub trades appear satisfactory.

(General Contractor) is the low bidder. (insert number) alternative prices were requested, (#1...). The inclusion of any figure does not change the status of the low bidder. Bids were accompanied with Bid Bonds.

(Explain alternative prices)

The tenders do not include any funds for items of a contingency nature. Normally we recommend (insert number) % of the tender price for such work.

Upon your affirmation of acceptance we will advise on your behalf (insert name of General Contractor) and issue a letter indicating acceptance of their bid. This will allow the Contractor to order materials, etc. pending preparation of the contract for signature.

Yours very truly,
Person, Designations
Title

Encl.

Client's logo

Letter of Acceptance

Project No.

Date:

Person:

Company:

Address:

Address (cont.)

Dear Sir or Madam :

Re: **Tender:**

Project Name:

Tenders for the above project were received at *(time and date)*. On behalf of the client, we would like to inform you that the tender of *(contractor)* has been accepted on the basis of low bid.

We would like to confirm that the alternate price *(description as required)* be included in this contract. The contract award will be for the base contract only, at your submitted price of *(insert bid amount)*, plus GST.

Please contact the undersigned to confirm details pertaining to the site mobilization, including as any further information required, access to existing drawings, and approach to be taken. We will require the name of your site supervisor and project manager as soon as possible. We also require a start-up meeting on site to familiarize those involved with the site, as well as set up a schedule for meetings and protocols.

As discussed, you are expected to complete the project on schedule as per the specifications, with the exception *(include exception if required)*.

We look forward to a successful completion of this project.

Yours truly,

Person, Designations
Title

c. Mr. Company Fax: *if required*

Client's logo

Letter to Unsuccessful Bidders

Project No.

Date:

Person:

Company:

Address:

Address (cont.)

Dear Sir or Madam :

Re: **Tender:**

Project Name:

Tenders for the above project were received at (time and date). On behalf of the client, we regret to inform you that the tender of (contractor) has been accepted on the basis of low bid.

We thank you for the submission of your bid, and hope that we have the opportunity of working with you in the future.

Enclosed please find your bid bond and consent of surety submitted with your tender. We would appreciate the prompt return of the tender documents in your possession, for which we will return your deposit cheque(s).

Yours truly,
Person, Designations
Title

c. Mr. Company Fax: if required

Logo or Name of Architectural Practice

Field Review Report 3

Project: ABC Building Renovation
10 Jones Avenue, Toronto

Contractor: Construction Contracting Ltd.

Weather: Sunny, 5° C

Date of Visit(s): October 4, 2009

Project No.: 08101

Building Permit No.: 174/09

GENERAL

1.1 Reviewed work in progress with Client.

WORK IN PROGRESS — OBSERVATIONS

2.1 Demolition of existing building complete. Sub-contractor to remove stockpiled materials at N.W. corner of site.

2.2 Site preparation — Topsoil removed and stockpiled on site. Existing paved surfaces removed. Rough grading complete. Equipment on site — one tractor, vibrator, and compactor.

2.3 Excavation for footings complete — see Structural Engineer's report.

2.4 Footings — Concrete footings poured along gridline A from grids 1 to 8. Forming footings for remainder of gridline A. Four workers plus superintendent. Reinforcing steel for footings delivered.

INFORMATION OR ACTION REQUIRED

3.1 Sketches made of existing 100 x 100 steel column at grid E3 to E9. Contractor to clear away miscellaneous wood to expose connection in order to verify shop drawing details of steel connection to existing.

ITEMS TO BE VERIFIED — None.

Report by: James Smith Title: Project Architect

_____(Project Architect)
(signature)

Distribution by fax: ABC Corporation — Client Representative
Construction Contracting Limited, Project Manager
Chief Building Official
Architect File

Attachments: Structural Engineer Field Review Report Number 3

Method of transmission:

Logo or Name of Practice

Summary of Changes

Project Name: _____ **Project No.:** _____

Proposed Change / Change Directive										Change Order						Remarks
No.	Description	Action								No.	Issued	Price Change ($)	Charge to Allowance	Time Change		
		Issued	Quote	Forward to Consultant				Return for Revision						Days	Cumulative Total	
				Issued	Discipline	Deadline	Rec'd	Issued	Deadline							
19.	Extra excavation	Aug. 21	15/09	16/09	S	23/09	25/09	27/09	10/10	19.						site conditions
	authorized by Change	Rev. 1	15/10	16/10	S	23/10	22/10	23/10	06/11							
	Directive	Rev. 2	12/11	12/11	S	15/11	14/11				17/11	11,500	Y	+3		
20.	Add Humidification to	03/09	27/09	28/09	M	02/10	03/10	04/10	11/10	20.						Owner's request
	staff room	Rev. 1	11/10	12/10	M	15/10	14/10				15/10	5,000	N	0		

Form 3.7

Logo or Name of Practice

Request for Information
RFI No._____

To:

From:

Project:

Issue Date:

Project no.

Requested Reply Date:

Copies to:

Description of Request:
(fully describe the question or type of information requested)

References / Attachments:
(List specific documents researched when seeking information requested, including specifications and drawings)

Recommendation or Direction to Contractor:
(if RFI concerns a site or construction condition, the sender may provide a recommended solution)

Reply:
(Provide answer to RFI, including cost and/or schedule considerations)

Response contained in contract documents ❑ **yes** ❑ **no**

By: _____ **Date:** _____

This form is based in part on AIA Document G716 -2004, reproduced with permission of the American institute of Architects (AIA).

SHOP DRAWING REVIEW

Date: November 12, 2008

File: 08301 4.6

Re: **Office and Courtroom Renovations for Accessibility**

Project ID: B0235A-0078 Contract ID: 016144

To: ACME Construction

Attention: John Doe,

Returning pdfs of lift shop drawings for Garaventa Stair Lift Xpress II prepared by West Elevators and Lifts and submitted by ACME Construction in an email on September 25, 2008.

Pages: transmittal+ 2 attachments as follows:

.1 1163- DMA
.2 1163- FMA

Note PCN 001 has been prepared since the submission of this shop drawing to resize the platform to suit site conditions. Please edit for the O&M Manuals.

- ❑ NO EXCEPTION TAKEN
- ❑ REJECTED
- ❑ SUBMIT SPECIFIED ITEM
- ■ MAKE CORRECTIONS NOTED **
- ❑ REVISE AND RESUBMIT

Checking is only for general conformance with the design concept of the project and general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his or her work with that of all other trades; and the satisfactory performance of his or her work.

Mary LeBlanc, Architect, FRAIC

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- ❑ SUBMIT SPECIFIED ITEM
- ■ MAKE CORRECTIONS NOTED **
- ❑ REVISE AND RESUBMIT

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Mary LeBlanc, Architect, FRAIC

SHOP DRAWING REVIEW

Date: November 18, 2008

File: 08301 4.6

Re: **Office and Courtroom Renovations for Accessibility**

Project ID: B0235A-0078 Contract ID: 016144

To: ACME Construction

Attention: John Doe,

Returning pdfs of shop drawings for Power Door Operators as prepared by Magic Entrance Systems Ltd. and submitted by ACME Construction on November 7, 2008.

Pages: This Review Sheet + 7 pages.

*** Note PCN 005 has been prepared since the submission of this shop drawing to:
a) Coordinate the location of the operators,
b) Provide a key switch in lieu of a push button to access the office from the corridor.
c) Include remote to electro magnetic lock as well as the power door operator.
d) Remote location of office door control to above washroom ceiling.
e) Please edit for the O&M Manuals.

❑ NO EXCEPTION TAKEN
❑ REJECTED
❑ SUBMIT SPECIFIED ITEM
■ MAKE CORRECTIONS NOTED **
❑ REVISE AND RESUBMIT

Checking is only for general conformance with the design concept of the project and general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his or her work with that of all other trades; and the satisfactory performance of his or her work.

.1 Finish – Anodized to match colour of frames (typical).
.2 Sheet 1 of 5 – Coordinate with glass transom. Do not obstruct glass.
.3 Switch Locations – Courtroom – as submitted. Office as per PCN 005 to be issued.

Mary LeBlanc, Architect, FRAIC

Logo or Name of Architectural Practice

Shop Drawing Review

Project: **No:**

Shop Drawing Type: **Date:**

Number of Pages Including this Shop Drawing Review Form:

Reviewed only as to general conformity with the design concept. The Architect does not warrant or represent that the information contained on this drawing is either accurate or complete. Sole responsibility for correct design, details and dimensions shall remain with the party submitting the drawing. Nothing herein reduces or removes specified requirements, unless specifically acknowledged by _____, in writing.

( ) REVIEWED ( ) REVIEWED AS MODIFIED ( ) REVISE & RE-SUBMIT ( ) NOT REVIEWED BY: ____

DISTRIBUTION: _____ **Copy**

_____ **Copies Contractor**

_____ **Copies Other**

COMMENTS:

1. CONFIRM ALL ELECTRICAL POWER CHARACTERISTICS WITH ELECTRICAL CONTRACTOR.
   (Include this if a mechanical shop drawing.)

2.

Project Number:

- ❑ Reviewed
- ❑ As Noted
- ❑ Revise and Resubmit

By:_____

Date:_____

Per General Conditions of the contract. Review is for conformity of design concept and general arrangement. Contractor is not relieved of responsibility for error or omissions, and shall meet all requirements of the contract.

Logo or Name of Architectural Practice

Log of Shop Drawings and Samples

Name of Project: _____ Project no.:_____

Review Legend

1. Not reviewed, not requested
2. Reviewed, do not resubmit
3. Reviewed with comments, do not resubmit
4. Rejected, resubmit

No.	Description of Shop Drawing or Sample	First Submission Dates								Second Submission Dates							
		Contractor to Architect **received**	Architect to Engineer **sent**	Engineer to Architect **received**	Architect to Contractor **sent**	Review Status				Contractor to Architect **received**	Architect to Engineer **sent**	Engineer to Architect **received**	Architect to Contractor **sent**	Review Status			
						1	2	3	4					1	2	3	4

Note: Provide additional columns if three or more submissions are required.

Canadian Handbook of Practice for Architects



Volume 3

Other Resources

3.1 Standard Documents of the Architectural Profession
3.2 Selected Standard Documents of the Canadian Construction Industry
3.3 Provincial Lien Legislation
3.4 Provincial Practice Bulletins or Practice Notes
3.5 RAIC Practice Builders
3.6 Other References

3.1 Standard Documents of the Architectural Profession

Canadian Handbook of Practice for Architects

3.1.1 Canadian Rules for the Conduct of Architectural Competitions: *Document Five*

3.1.2 Canadian Standard Form of Agreement Between Client and Architect: *Document Six*

3.1.3 Canadian Standard Form of Agreement Between Client and Architect — Abbreviated Version: *Document Seven*

3.1.4 Canadian Standard Form of Agreement Between Architect and Consultant: *Document Nine*

3.2 Selected Standard Documents of the Canadian Construction Industry

3.2.1 Stipulated Price Contract — CCDC 2

3.2.2 Cost Plus Contract — CCDC 3

3.2.3 Statutory Declaration Forms — CCDC 9A, 9B, 9C

3.2.4 Stipulated Price Construction Bid Form — CCDC 10

3.2.5 Contractor's Qualification Statement — CCDC 11

3.2.6 Project Financial Information — CCDC 12

3.2.7 Design-Build Stipulated Price Contract — CCA — CSC — RAIC *Document 14*

3.2.8 A Guide to the Use of CCDC 2 — 1994 — CCDC 20

3.2.9 A Guide to Construction Surety Bonds — CCDC 22

3.2.10 A Guide to Calling Bids and Awarding Contracts — CCDC 23

3.2.11 A Guide to Model Forms and Support Documents — CCDC 24 *(c/w computer disk)*

3.2.12 Rules for Mediation and Arbitration of Construction Disputes — CCDC 40

3.2.13 A Guide to the Use of CCDC 3 — CCDC 43

3.3 Provincial Lien Legislation

3.4 Provincial Practice Bulletins or Practice Notes

3.5 RAIC Practice Builders

3.5.1 List: RAIC Practice Builders

List: RAIC Practice Builders

- Building with Media
- Building Information Modelling (BIM)
- Construction and Demolition Waste Management Specifications
- Tips to Get Your Finances in Shape
- 60 Winning Proposal and Professional Tips
- 75 Tips to Keep Clients
- An Intense Look At Decision Makers
- Building Credibility and Confidence
- Firm Valuation
- Guide to Using Consultants
- ISO 9000 and Your Practice
- Networking to Build Your Practice
- Ownership Transition
- Project Management - Keys to Leadership
- Setting Your Yardstick for Growth and A Vision to Pursue
- Strategic Planning = Market Share
- Tips for Successful Marketing
- Tips to Avoid Fee Bidding

3.6 Other References

3.6